INDUSTRIAL DEVELOPMENT

A VALUE STRATEGY FOR B.C. SOLID WOOD PRODUCTS

ECONOMIC & REGIONAL DEVELOPMENT AGREEMENT

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A VALUE STRATEGY FOR B.C. SOLID WOOD PRODUCTS

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Deloitte, Haskins & Sells in association with Carroll-Hatch (International) Ltd. and H. E. Manning.

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March 23, 1988

Management Committee
Canada-British Columbia
Industrial Development Agreement

Dear Sirs,

The consortium of Deloitte Haskins + Sells, Carroll-Hatch (International) Ltd. and H. E. Manning is pleased to submit our final report entitled **"A Value Strategy for the B. C. Solid Wood Products Industry"**.

The report sets out a recommended strategy and policy for the further economic development of specialty wood products and is based on assessment of present industry strategy and practices, an overview of market influences and opportunities, and a detailed analysis of revenue potential and production alternatives.

We appreciate the opportunity given us to conduct this work and to assist the senior levels of government in formulating an industrial strategy directed to a major opportunity in the forest industry. The co-operation and participation of the Steering Committee throughout the respective phases of the assignment was also much appreciated.

On behalf of the consulting consortium,

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A VALUE STRATEGY FOR
B. C. SOLID WOOD PRODUCTS

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SPECIALTY WOOD PRODUCTS INDUSTRY ASSESSMENT AND STRATEGIC DEVELOPMENT

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Executive Summary

EXECUTIVE SUMMARY

INTRODUCTION - THE STUDY PREMISE AND OBJECTIVE

The British Columbia solid wood products sector of the forest economy is a well developed, mature and technologically advanced industry characterized by an infrastructure largely directed and oriented to worldwide marketing, sales, distribution and mass production of commodity lumber grades. There is an increasing recognition that while in its present form, the industry faces real constraints to further growth, significant opportunities exist to achieve added profitability from the present timber resource through development and implementation of strategies and programs directed to the marketing and manufacture of higher valued-added products.

Specialty product manufacturing capacity to add value to the products of the primary industry has not yet been developed to any large degree in British Columbia. This has been largely due to a reluctance of the primary processors to implement a change of direction from a "volume to value" strategy which in turn, is due to perceptions that there is not a clear "business case" to do so. The constraints of small and specialized markets, the necessity for more entrepreneurial management, the need for attention to detail, the seemingly adverse impact of specialty production on mass production economics, or added costs, are all cited as major factors.

It is, within this 'opportunity' context that the provincial and federal governments, through the provisions of the Industrial Development Agreement, have commissioned this major study of value-added opportunities and strategy undertaken by a consortium of Deloitte Haskins & Sells and Carroll-Hatch (International) Ltd. together with H.E. Manning.

THE B.C. SOLID WOOD PRODUCTS INDUSTRY - ITS SIZE AND IMPACT

British Columbia has a major presence in the world forest industry and has one of the finest softwood forests in the world in terms of species and grade characteristics:

* the yearly harvest of softwood trees in British Columbia is 7.5 percent of the world softwood harvest and 45 percent of the Canadian total;

* steady growth in world consumption of softwood is projected through to the next century. Over the next dozen years, softwood lumber consumption is expected to increase at a rate of just under one percent per year;

* British Columbia alone accounts for 35 percent of world exports of softwood lumber, and produced, in 1986, over 13 billion board feet.

COMMODITIES AND SPECIALTY PRODUCTS

It is recognized that the specialty products sector is diverse in terms of product, process and degree of integration. This fragmentation has frustrated past efforts to classify and analyze the industry. However, the definition is not central to strategic exploitation and development of value added opportunity. What is important is developing a clear understanding of the nature of commodity and specialty product manufacture and marketing and the different approaches and requirements needed in these 'very dissimilar' businesses.

* Specialty product manufacture must begin in the forest, with the manufacture of the logs and into the important primary breakdown unit and then into the remanufacturing, and finally, secondary or finish manufacture of that end product. In this respect a massive amount of broad industry education on specialty product manufacture is required.

* The assumptions or implications of **commodity product trading** are generally:

- the product is categorized or graded to some rule;
- the product is distributed in mass or large volumes;
- a number of distribution functions are required to service the large economies of scale;
- price lists of the commodity products are widely circulated;
- very often, the people involved in buying and selling the product never see the product;
- the product is mass produced for production efficiencies;
- the price for a product is generally well established. Competitive advantage is gained through production efficiencies or distribution methods;
- selling predominates. Little marketing occurs;
- the product distribution is accomplished by using inventories;
- minimal customer/producer interface occurs.

* The assumptions or implications of the **value-added product** or **specialty product manufacture** are generally:

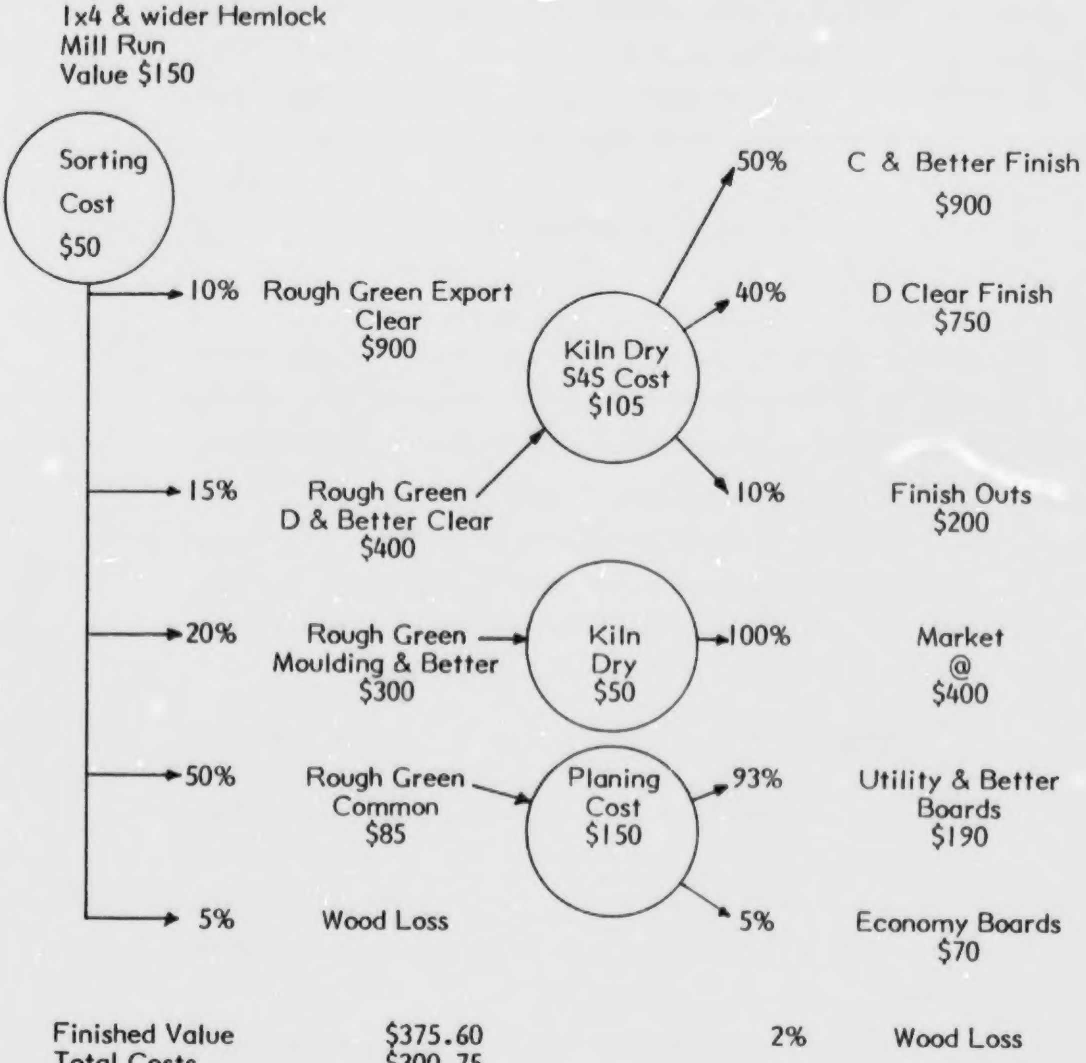
- more operations will be performed on the product, thus requiring more people and/or creating more employment;
- specialty product manufacture requires a different form of marketing and selling than that used for a commodity product;
- specialty product manufacture should provide a higher net return to the resource owner;

- raw materials are usually the key element in cost of manufacture. Effective materials management is essential to profitability;
- specialty product manufacture requires better communication between the producer and the end-user than commodity processing;
- specialty product manufacture generally demands much more rigid quality control in production;
- specialty product manufacture implies a high degree of service between the producer and the end-user.
- remanufacturing involves some form of processing a primary lumber product to add value. The processing can be simply sorting of the primary lumber product or any combination of sorting, drying, resawing, dressing, ripping, cutting, finger-jointing, edge gluing, and packaging operations;
- the following example illustrates, in concept, a simplified remanufacturing run that demonstrates, by further processing and sorting various grade outturns, how the value of the fibre output can be significantly improved.

An illustrative example of a remanufacturing process to obtain 'added value' from the lumber product is shown overleaf.

ONE EXAMPLE OF REMANUFACTURING PROCESS ANALYSIS

The unit values are representative only and intended to demonstrate the concept of added value through further processing.


1x4 & wider Hemlock
Mill Run
Value $150
Sorting Cost $50
10% Rough Green Export Clear $900
15% Rough Green D & Better Clear $400
20% Rough Green Moulding & Better $300
50% Rough Green Common $85
5% Wood Loss
Kiln Dry S4S Cost $105
50% C & Better Finish $900
40% D Clear Finish $750
10% Finish Outs $200
Kiln Dry $50
100% Market @ $400
Planing Cost $150
93% Utility & Better Boards $190
5% Economy Boards $70
2% Wood Loss

Finished Value	$375.60
Total Costs	$300.75
Potential Profit	$ 74.85

TYPES OF REMANUFACTURERS - DIFFERENT APPROACHES

* Specialty products comprise a wide variety of items with specific characteristics tied to end user requirements and relatively limited demand spread over a wide area of market regions. The industry requires flexibility in production scale, specialization in processing, close attention to all aspects of materials utilization and clear communication links between producer and end user. These requirements are very dissimiliar to the production, supply and marketing practices required of mass volume commodities.

* In the remanufacturing or specialty product manufacturing, different types of operations have evolved as follows:

- Some **primary producers** have embarked on independent programs of specialty product manufacturing and as such, have built remanufacturing facilities to produce specialty products;
- **Individual entrepreneurs** have recognized opportunities that exist in producing specialty product manufacturers, and as such proceeded to develop their own markets, build their own facilities, purchase their own raw material on a market basis from either a primary producer or a wholesaler;
- The **custom processor** works material on a custom basis for some primary cutter, or a wholesaler, and is purely a production-oriented facility. The primary cutter or wholesaler purchases the wood and markets it. The custom processor simply processes the wood to the clients' specifications. Some of the larger and more successful remanufacturers are in this category;
- A fourth type of remanufacturer is generally known as a **"scavenger"** type operation. This entrepreneur recognizes

some opportunities available in the processing of some problem wood or low grade wood that the primary manufacturer cannot effectively or economically deal with;

- The fifth remanufacturing facility is a **joint venture,** where a client or customer (perhaps from offshore) joint ventures financially in the development of a remanufacturing facility in British Columbia. Although this is a relatively new concept, a number of facilities are either developed, or in the process of being developed within British Columbia.

EXTENT OF REMANUFACTURE - A GROWTH INDUSTRY

* There is growth in the manufacture of specialty forest products.

* In 1986, about 2.3 billion board feet of various products were produced accounting for 14.3 percent of total lumber production. Of this, approximately 755 billion board feet or 33 percent was manufactured directly by primary lumber producers.

* There are currently 195 specialty product mills in the province of which 149 are independent remanners including custom cutters.

* There is a heavy concentration of reman operations in the Lower Mainland accounting for over 72 percent of total production.

* Species concentration is presently in Western Red Cedar - a developed specialty product industry.

MARKETS AND MARKETING - THE CRUX OF CULTURAL CHANGE

- A much better understanding of marketing and the factors that influence markets must be developed by the industry.

- The production of specialty products requires a much closer inter-relation between the customer and the producer.

- The customer requires a very specific and unique grade and quality of product in quantities to match his needs. Few specialty products are sold by general grading rules.

- Specialty products also demand superior service. The customer depends and relies on his purchase for quality and timely delivery of his product with minimal effects of carrying inventory. Often this quality product and service offsets any cheap price another product might be portrayed to have in the market place. Very often the quality and service mean more to the customer than the unit price he must pay.

- A number of changes are occurring, throughout the world effecting the demand for British Columbia solid wood products.

- More processing can be done in British Columbia by supplying an industrial blank or remanufactured product instead of shipping a rough green product. For example a number of products are shipped off shore and processed with a resultant falldown, transportation of non-useable product and costs of disposal of the waste product.

- Throughout the world, especially in Southeast Asia, the availability of hardwood roundwood is diminishing. Supplies of hardwood roundwood species to Japan have been greatly reduced by countries such as Indonesia.

- The replacement of other softwood species is also occurring. In Scandinavia, it is suggested they are processing the 7th forest and as a result the quality of wood fibre is much reduced. Some estimates indicate that 6 million m^3 of joinery products have been marketed annually in Europe in the past from Scandinavia, but only 2.5 million m^3 of joinery products are available today. As a result, other sources of wood must be derived.

- Some markets have very specific preferences for colour and clear appearances. Some of the products from British Columbia are well suited to provide these exclusive qualities and as a result can demand premium prices in the market place. Western Red Cedar for example has become a valuable decorative species in limited supply as a replacement for the redwood species.

- The shortages of wood fibre in other species are forcing the changes of secondary or finished manufacture to species like hemlock and lodgepole pine. A developing hardwood shortage and/or cost is forcing use of softwood species in joinery, furniture, doors, windows, etc. The use of hemlock softwood spindles is such an example.

- The lack of processing ability, especially drying capability on the coast is impeding the ability to service some markets. In addition, some concern for lack of acceptance of anti-stain treated lumber in various markets is forcing production into dry lumber products. Japanese preference for dry product framing lumber, although largely developed by British Columbia for green hemlock, has forced the use of dry SPF and American dried hemlock because coastal British Columbia cannot supply the dry hemlock demands.

- Failure to adequately promote our wood products and production of specialty products is dramatically creating the influx of competitive products into our wood product market, such as aluminum, vinyl and steel impacting on the siding, door and window markets.

- The market end-uses of products are changing. For example, the use of wood in remodelling is growing at a quicker rate of growth than new housing starts.
- Currency exchange rates have a dramatic influence on profitability and market strategy.
- Transportation and distance of product to the market place also contribute to market influences.

OVERALL ASSESSMENT - STRENGTHS TO BUILD ON AND LIMITATIONS TO ADDRESS

In summary, advantages or strengths which favour the development of the specialty products sector relate to:

- the added revenue and profit potential for value added manufacture;
- a supportive political will to assist in development of further value added manufacture and marketing;
- the pre-eminent position of British Columbia as a lumber producer and exporter;
- the existence of a comprehensive and skilled support infrastructure including marketing, production, technological expertise, supply and distribution;
- the diversity, quality and quantity of the wood supply;
- the efficiency of primary lumber processors and the concentration of major producers.

The key limitations or constraints are:

- the general lack of awareness of the potential by the producers which has led to a degree of inertia;
- the lack of industry wide marketing and promotion;
- the absence of market knowledge, marketing strategy and market resource data;
- the present deficiencies in selling, distribution and supply channels which are generally geared to commodity products and are not sufficiently sensitive to continuity of supply, meeting customer needs, maintaining quality, etc.

Provincial and industry advantages and strengths outweigh the limitations except for the need for a far more aggressive entrepreneurial approach, competing for global markets in an ever changing economic and political environment.

THE KEY ISSUES

The following key issues emerge.

- The Need for Market Strategy Formulation

  The challenge lies in the re-orientation of the solid wood industry from one of predominantly commodity manufacture to a balanced mix of commodity and specialty product marketing/manufacture. The thrust of change is primarily directed to marketing which will increasingly demand coordinated market strategies and policy formulation directed to each of the key market areas.

* Industry Perception and Awareness of Specialty Product Opportunity

The comparative advantage of a 'value versus volume' approach is not yet sufficiently perceived to outweigh the risk or disadvantage. While advances are being made by certain of the major companies, the evolution, at this stage however, is relatively slow and the inertia of present behaviour patterns is a large factor for this lack of thrust. The companies, in general, view the value strategy as not having application to their particular business.

* Lack of Market Research and Follow-Up

The overall marketing approach is fragmented and uneven, being based on individual company initiatives, and characterized by a degree of 'not following up' on identifiable opportunities.

* Industry Concentration

There is a high degree of industry concentration in both timber harvesting and lumber production.

* Primary Processing for Specialty Product Manufacture

Some primary processors overestimate what is required in terms of mill capitalization, equipment or process reconfiguration, etc. to obtain improved values from initial log breakdown.

* Profit Improvement Potential

Increased revenues and bottom line results can be achieved through improved log, fibre and grade recovery practices and capital investment programs directed to these areas.

- 'Sort, Sort, Sort!'

  Sorting of logs and lumber by species, grade and size is essential to obtaining value. Sorting represents costs, and interruption of process flow. Without planning, these are incompatible with present mass production, low cost commodity approaches. The issue is how to introduce and integrate the sorting requirement into prevailing logging and lumber practices to achieve an optimum profit balance.

- Integration of the 'Two Industries'

  The integration of the primary producer (big and small) and the specialty product manufacturer/entrepreneur in terms of synergistic arrangements viz. production, marketing and distribution is a desirable element to the future evolution and maturity of the value strategy. The 'two industries' are widely disparate, yet each has an essential role to play in developing the total potential.

- The Impact of Labour as a Factor

  It is commonly believed that specialty wood product manufacture is labour intensive and that a non-union mill environment is advantageous in terms of lower costs and manning flexibility. These two assumptions are not necessarily valid in all circumstances.

  As a cost, labour may well represent 10 to 20 percent of the total manufacturing expense, depending on the product and process.

- Material Procurement

  Material procurement and utilization are also key criteria for success or failure.

- Specialty Products Support Infrastructure

  The forest industry is well served by a highly developed support/service infrastructure directed to member interests related to market promotion, standards, product and processing research, sales and distribution, export financing, etc. Specialty product manufacture, however, does not yet have a priority position within approved programs or organizational segments of these agencies. Also, the small, independent entrepreneur has limited access or representation to such service.

- Bridging the Gap - The End-User and the Producer

  Unlike the construction lumber market, specialty products require clear understanding as to what constitutes value to the end-user, how the product is processed, what part of the end-user process does the product fit, what sizes, shape, characteristics, etc. are essential, what packaging, supply needs are to be met, etc. The maturity of the specialty products industry will require the development of 'channels of communication and supply' via the marketing and distribution process.

- Present Adverse Market Perceptions

  There exist certain adverse market perceptions of the British Columbia supply of forest products related to past and present quality problems, interruptions in continuity of supply, not meeting specifications, lack of commitment to 'long term relationships', (short term opportunism), opportunistic activities by promoters, wholesalers or brokers, uninformed competition with importing country infrastructures (eg. going too far in vertical product manufacture), etc. These will have to be overcome in future development efforts for specialty products.

* Fibre and Supply

In terms of lumber supply to the independent specialty product manufacturer (who has no direct access to tenure), there is an adequate supply from the primary to the independent, depending on the latter's ability to pay market prices. The problem is in the lower value end or 'scavenger' mill operator who frequently cannot afford the competitive price or cannot obtain access to sufficient volumes of grade/size/species required by his operation to maintain required inventory levels, and which the primary is able to provide only sporadically. This will become more of a problem as the primary improves grade recovery and sorting ability. This problem is a free-market one which has a direct bearing on the business feasibility of this kind of independent operation.

* Long Term Commitment versus Short Term Opportunism

Specialty product market acceptance requires a long term customer relationship and commitment, the development of which means the avoidance of short term opportunistic steps such as those related to quick, exploitation of foreign currency advantages with subsequent market exits, etc.

* The Myth of 'Unlimited Opportunity in Every Direction'

There are frequently expressed views (usually by promoters or 'would be' entrepreneurs) on the unlimited market opportunities for British Columbia wood and special products. This perception tends to promote undue optimism as to profit and ease of entry in developing exotic export potential and clouds the 'real world' of the need of the successful entrepreneur to carefully:

- identify niches and market demand;
- access raw material sources and type which meet product requirements;

- develop an appropriate distribution and supply channel;
- put a suitable manufacturing facility 'in place';
- obtain needed financing (and develop a business plan to obtain such financing);
- manage material usage and control;
- provide a product that meets customer requirements as to quality, supply and price.

* Profitability

While profitability and rate of return potential is demonstrated in the various 'business case' models, and hypothetical projections, profitability is by no means assured in specialty product manufacture per se.

Key factors impacting net return relate to:

- Raw material management.

  Generally, 60 to 80 percent of the total direct cost of manufacture is in raw materials, i.e. lumber, depending on the nature and extent of the operations.

- Labour utilization and cost.

- Overhead.

- Pricing.

  Specialty product pricing is determined in large part by what the end-user perceives as value. This includes the site specific 'economics' of the user of the product, in either displacing present supply or modifying operations within the user plant. Therefore, pricing is more negotiable and site specific to the customer than for commodity products.

* Management Imperatives

There is nothing more important to the reman enterprise than management effectiveness. Typically, the size of the operation dictates that the manager must function, directly, in most phases of the operation because few independent companies will be large enough to afford experts in raw material acquisition, production control, labour relations, sales, administration etc., etc. The individual who can adjust his perspective from broad concepts to the 'hands on' detail of small orders and waste recovery is rare but without such talents in either one or a few persons, an enterprise can be defeated.

PRODUCTION APPROACHES FOR VALUE-ADDED

* A number of different hypothetical representations of the economics of specialty products were made to test the sensitivities of various factors. A number of analyses were made to demonstrate the critical elements effecting specialty product manufacture.

* Basic primary and remanufacturing mill business cases were analyzed for mill economics, production statistics, and alternative cutting programs. Hypothetical mills for coastal hemlock, Interior SPF and lodgepole pine were demonstrated. Demonstration of the economics of hypothetical remanufacturing were also shown.

* A number of illustrative applications were shown to demonstrate the business case of specialty product manufacture applied to:

- log manufacturing/merchandizing;
- alternative market programs for the primary sawmill;
- alternative cutting programs in the primary sawmill;
- additional sorting, grading, product capability in the primary sawmill;
- cant cutting in the primary sawmill;
- remanufacturing capability in a separate operation.

* Economic advantages were identified in terms of recommended production practices in each of the above applications.

ADDED REVENUE POTENTIAL - A SIGNIFICANT OPPORTUNITY

Analysis was made of the potential measurement of the values to be extracted from the fibre of the forest resource in solid wood products in British Columbia. Consideration of this potential must recognize a number of caveats that are detailed in the report. Different scenarios are suggested for the base case: improvements with no capital for the primary sawmill, and improvements with capital for the primary sawmills for enhanced fibre recovery; grade recovery, and different production scenarios. These estimates or hypothetical valuations were made for each of the major species of British Columbia, and are contained in the body of the main report.

The analyses demonstrate, that while a marginal improvement in the volume of specialty products coupled with an improvement in the fibre and grade recovery from the log resulted in substantial additional revenue generation, that **with specialty product manufacture, substantially quicker and greater revenues would result than from capital invested in the primary sawmill for fibre and grade recovery.**

RECOMMENDED STRATEGY - A PATH TO OPPORTUNITY

There is an emerging recognition and consensus that the key opportunities for major growth in the British Columbia forest industry lie in the manufacture and marketing of more diverse and higher valued products further developed toward end use. For solid wood products, this means an industry commitment to a strategy of redirection from high volume, low cost manufacture of commodity lumber to one embracing an optimal economic balance between volume and value priorities.

THE OVERALL PREMISES

There has been substantial commercial development in the specialty products industry, particularly during the past five years. This has been effected by the efforts of a few primary lumber producers (big and small), independent reman entrepreneurs and by joint efforts between the two groups. Recommendations for the further development of the industry are based upon the following key premises.

* There is adequate wood fibre.

* There are adequate markets for existing products and adequate potential markets for future manufacturing if proper market development is carried out.

* There is a significant profit potential to be realized.

- Private enterprise, pursuing profit will provide the driving forces needed for development.

- There is need for major supportive policies and programs by the public sector to stimulate both demand and supply. It is deemed, however, that prescriptive or interventionist actions are not needed.

- The desired future of the solid wood industry in British Columbia is perceived to be one of economic balance and integration of the manufacture of both commodity lumber and specialty wood products.

- The report contends that it is purposeful to divert lumber production to grades suitable for remanufacture, and acknowledges that these must be site-specific examinations.

- Each company has its individual responsibility to decide for themselves the degree to which products for added-value fit their strategy.

To develop a business case, the following steps are indicated:

a) Obtain an understanding of the concept and the implications of value-added in terms of the business and the organization;

b) Examine present processes, product mix and markets and the raw material base;

c) Determine the basis of how present production can be profitably diverted or changed to value-added manufacture and marketing;

d) Determine the potential for new products and/or new markets through new manufacturing processes;

e) Develop a business feasibility plan for specialty products, and

f) Incorporate the plan into the overall strategies and operational plan of the total business.

* There is a role for both the primary lumber producer and the independent reman entrepreneur and it must be recognized.

* There is an extraordinary lack of clear understanding of both the limits and the scope and nature of the reman industry including its potential opportunity. This is observed in discussion with several companies and, on occasion, within all levels of management and certain agencies influencing the forest industry.

* The primary producer will be the determining influence for the growth of the specialty product industry. Without the volume being produced in grade and cross section, suitable for remanufacture, many of the value-added items cannot be produced. This redirection is not a capital intensive undertaking in most operations.

* The reman operator, by virtue of the entrepreneurial character, and type and scale of facility, can complement the primary producer.

* The reman industry will grow, regardless of government stimuli. The pace at which it will grow is the most important consideration in charting the future of the solid wood products industry. There is not yet enough awareness of opportunity to redirect the industry to its logical potential. The inertia in some

management groups which has characterized a part of the industry heretofore can, if allowed, forestall this evolution.

- Not all of the lumber companies can change or diversify their process for good and sufficient reasons but the resource is available, the market is adequate, the financial climate is good and the determination must be nourished, to reduce the supply of "Commodity Lumber" and increase the "further manufactured" product side.

- Factual data have been combined with the best knowledge of experts to clearly demonstrate that the forest resource can yield a significantly greater revenue if changes in the primary process are made with a view to cutting and/or sorting, and/or further manufacturing stock for production of specialty products.

- This incremental revenue is of a magnitude that it should encourage all primary producers to examine the site specific circumstances relating to each operation and to examine the merits of specialty products, either as a supplier or a manufacturer. Some sawmill configurations, with reasonable or little additional capital expenditure, can accommodate a modified cutting program to yield this greater value.

- Change has been effected in many industries by the invention of "new" machines or processes, but no new machine has come on stream in the past few decades to dramatically change lumber cutting. Refinements, particularly in process control and materials handling, have made improvements. But it is important to understand, that to bring this industry to an increase of reman products, great capital expenditures are not required. It is a problem of education, with the concomitant dedication to market exploitation.

* An important consequence of diverting lumber production to specialty products will be to decrease the North American supply of commodity products.

THE FOLLOWING FUNDAMENTAL STRATEGY IS INDICATED:

I. forthwith, embark upon a market promotion -- exploitation-- development program to create an increasing demand for reman specialty products which exceeds the anticipated supply growth;

II. each company judge the degree to which the manufacture of products for added-value fits their enterprise and develop a business strategy therefore;

III. allow the reman production to grow with the normal thrust of private enterprise, utilizing existing public sector financial assistance programs coupled with other supportive processes.

As a consequence of market demand stimulation, supply from the primary sawmills will develop on a firm foundation, with stability and profitability.

A better relationship between the primary producer and the reman operator is essential.

In light of the foregoing discussion, the rate of expansion of the reman industry is perceived to be the most critical factor to be considered by all parties.

The rate of expansion of product supply must not exceed the rate of expansion of market development for those products or the purpose of the diversion will be frustrated and the consequential financial damage could be irreparable.

MARKET RESEARCH, EXPLOITATION, DEVELOPMENT AND PROMOTION

* Some manufacturers may choose to do their own market development, and indeed, have already embarked on such programs. There are also government programs created to assist with this process. This report does not discount nor attempt to dissuade such initiatives. However it is deemed to be of the utmost importance that overall market development NOT be left to individual effort but orchestrated by professionals to achieve the maximum benefits possible through applied expertise and disciplined, concentrated thrust.

* It is believed absolutely essential that the funding for the promotional program to be committed, irrevocably for a minimum of 5 years, with 5 year forward budgeting processes, to ensure the market can be built on a solid foundation without danger of premature cancellation or reduction.

* There is an urgency that must be accommodated.

* It is germane to note here that for many years it has been the expressed desire of governments to stimulate additional production of "value-added" forest products. Progress towards this laudable objective is probable with prompt and direct action but delays in getting a satisfactory program under way could prove extremely damaging.

* We also recommend that:

1. A **permanent display** and promotion headquarters be set up at the British Columbia Enterprise Centre, equipped with full audio-visual and electronic communications to facilitate the exchange

of intelligence through all levels of trade from the end user to the manufacturer and, importantly, from manufacturer to end user.

2. A program should be initiated that will handle an **Annual Wood Fair** in British Columbia to which the world's wood users should be invited for the purposes of market exploitation and development. Set up a permanent secretariat to be seen to exist -- all year round -- outside the administrative offices of C.O.F.I. but working in harmony with them and also the appropriate agencies in both levels of Government.

3. Develop at the Enterprise Centre a service, to assist in the practical evaluation, development and 'commercialization' of product and business initiative opportunities.

   This office should be capable of assisting interested parties, both visiting and provincial, where and to whom they should direct their enquiries for further intelligence on this developing industry. This is perceived to be an important function, to be undertaken by a high profile staff, knowledgeable of and with the confidence of the forest industry. Such a staff could perform a necessary liaison between all interested parties and be effective in circumventing delaying impediments.

4. The provincial government, working with the support of the Federal Department of Industrial Regional Expansion, should set up forthwith, **a major symposium** to involve all levels of enterprise to enhance the development of the reman industry in the province.

   An interface between the reman operator and the other sectors of the forest industry must take place sooner or later or the confrontational atmosphere that presently exists in some quarters will not dissipate. A strong and complementary relationship must be achieved.

A better understanding on the part of both the primary manufacturer and the reman operator, (even if they be in the same corporation) of the needs and limitations of the other party, is needed to negate some of the misunderstandings observed to exist.

5. **Regional seminars** are recommended to spread awareness of methods of manufacturing lumber alternatives to 'commodity cutting' and to demonstrate the values to be achieved. The subject content of the seminars should be tailored to the type and extent of the timber resource or species mix within the region, and should recognize site specific factors influencing grade, recovery, product alternatives, costs, etc.

6. Governments must continue efforts to ameliorate the competitive disadvantages of discriminatory tariffs and non-tariff barriers in trading regions wherever possible.

7. There exists a presumption that the typical reman operator has insufficient identifiable collateral to warrant accommodation in some financial quarters. This may be due to the belief that "tenure" or "Guaranteed Raw Material Supply" are the only suitable assets. Assistance by the governments to correct this impression could be helpful.

SUPPLY AND DISTRIBUTION

- There is a significant profit to be obtained through modified processing methods directed to sorting, cutting and remanufacturing operations.

- A catalyst is needed to promote change based on awareness and, the public sector can play a supportive role in this respect. The Provincial Government, as custodians of the resource, should ensure that the pertinent facts are before all of the persons in a position to make decisions. They must be made aware of the need for change and the potential for British Columbia if a satisfactory degree of change comes about. The dissemination of this sort of information is a proper, important, and effective use of Government funds. Comments on the need for a symposium and the conduct of regional seminars have been noted earlier.

- Developing the most appropriate channel of supply distribution to effect better linkages between end-user and producer is highly dependent on geographic markets.

- Each market is sold in a manner unique onto itself with advantages and constraints peculiar to each. There are many avenues of trade for each market (agents, wholesalers, exporters, brass platers, etc.). Time and experience will sort out the best and the survivors.

THE NEEDS OF THE SMALLER INDEPENDENT REMAN ENTREPRENEUR

- Much concern has been expressed for the needs and the future of the smaller entrepreneurs who have played a significant role in developing the specialty wood products industry, and who still have a large stake in product manufacture and marketing. The entrepreneurial nature of the owners, their marketing orientation and the type of facilities employed lend themselves to the flexibility and smaller scale of operations needed for the reman industry. This has been recognized by some primary producers who have embarked on a value strategy and, as a consequence, have formed effective relationships on a custom cutting basis. Combining the primary effectiveness of log processing with the 'attention to detail' of the small reman operation is desirable.

- OBTAINING SUFFICIENT SUPPLY of the required grade and species at reasonable price levels has been an expressed concern of some independents, and it has proven valid. However, it is judged that the fibre exists in ample quantities. Some reman companies have achieved a stable supply of raw material through their expertise in purchasing and negotiation and long range planning. Most importantly, as the market for reman products grows through stimulation, a greater number of primary sawmill operators will modify their cutting procedures to extract the suitable grades from the log for further manufacture in their own operations or have it done on a custom basis. In either event, the desired end result will be achieved.

- The FINANCIAL AND TECHNICAL PROBLEMS faced by the small company may be a major inhibitant to growth. It is noted that there are many government agencies already set up to advise and assist and there is professional expertise available within the community. The extent to which these are utilized becomes a matter of individual initiative. In the development of this report, it was observed that there is a remarkable lack of awareness of the assistance currently available from both levels of government, and from professional consultants within the province.

* SELLING the product may become an expensive exercise, both in selling costs and the inability to obtain the full value of the product due to lack of expertise. He may find the best avenue to the market, is to align with one of the traditional agencies already active in the respective markets.

* It is noted that JOINT VENTURE and VENTURE CAPITAL concepts may facilitate cooperative initiatives between primaries and reman independents and investors. Each has a contribution to make and with such approaches, each would have a stake in cooperative endeavours.

OTHER COMMENTS

* It is a misconception that manufacture of specialty products can only be done by an independent small company. Future expansion could well be in the form of satellite divisions of primary manufacturers or arm's length corporations acting in concert, or custom services or any of many forms of cooperation. Private endeavor will probably develop these relationships satisfactorably, but the governments should be ready to assist and cooperate in any reasonable way they can.

* There is a perception that the reman industry is labour intensive. This depends upon the type of product and the mill configuration. In general, direct labour is normally about one-third as great a component of cost as is raw material. However the British Columbia manufacturer of reman products must compete with producers of the same product in other countries (in U.S.A., United Kingdom, Germany, Japan, etc.) from our British Columbia species or species from other countries. Lack of flexibility in the application of labour or an intransigent attitude in the

labour force can dramatically impede the growth and competitive posture of British Columbia internationally. An intractable attitude on the part of the owner/manager also can be an impediment. It is of vital importance that all parties, labour, management, government agencies et al, be conscious of the difference in the marketing procedures of "Reman products" as opposed to "Commodity products." Scheduling of precise quantities of specific components creates an interdependence between manufacturer and end user that cannot accommodate sporadic or interrupted flow. British Columbia must be seen to be committed to the regular and consistant flow of on grade material or the enterprise will fail for lack of credibility and will frustrate the objective of bringing back to British Columbia, the further manufacture of this resource presently being carried out in foreign markets with their own labour.

- Further manufacture of lumber into specialty products and the secondary manufacture of end-use products will, of necessity, create a greater problem of waste disposal than exists. Many of these operations are in urban or suburban areas where ecology constraints must be accommodated. Imagination and innovative planning can assist in circumventing this impediment and all government agencies, Municipal, Provincial and Federal, must be cooperative and supportive, not only in the problems of disposing of waste but, with great importance, assisting in converting this waste problem into a commercial product.

- A diversion of fibre from commodity manufacture to specialty products will not negate the importance of foreign exchange but British Columbia should have a greater range of foreign countries purchasing the products with a diversity of foreign currencies, some of which may be less adversely effected than others from time to time. In this regard, it is judged to be extremely important that the development of the foreign markets be undertaken forthwith, whilst foreign currencies are to our advantage.

- Research and Development should be encouraged. The body of the report indicates that advances can be made in:

  a) Market Research
  b) Product Research
  c) Technical Research

  A listing of priority areas for research initiatives are detailed in the report.

- There is a need for a supportive research to reach agreement on priorities, funding and methodology for technology transfer particularly as this effects the smaller independent.

- Training curricula should be expanded in those specifics listed in the main body of the report. A higher level of education, as an industry standard, is desirable.

- Time and resources have not permitted an examination of the secondary manufacturing industry in the depth undertaken for the manufacture of specialty products. Neither has a business case been developed for such manufacture as has been done for specialty lumber.

CONCLUSION

In the development of this report, a consensus was reached that:

* The recommended market exploitation and promotional activities be assigned a most urgent priority;

* Lumber manufacturers must be made aware of the benefits that can be achieved by the redirection of fiber into grades and cross sections suitable for remanufacture into specialty products. The governments can and should disseminate the facts of this report, but it is incumbent on individual company management to judge to what extent these data are applicable to their operations;

* An industry symposium should be held at the earliest reasonable date to give the industry the opportunity to discuss the broad subject of "added-value" production and most importantly, provide the forum for the interface between the primary producer and the reman entrepreneur;

* Plans should be made for regional seminars to follow up on the general symposium referred to above;

* Plans should be made to set up, without delay, facilities at B.C. Enterprise Centre which can organize the product displays and wood fairs, and be capable of advising interested parties, both visiting and provincial, where and to whom they should direct their enquiries for further intelligence on this developing industry.

The community of British Columbia and indeed, the economy of the whole of Canada can be enhanced by the growth of the specialty forest products manufacturing industry. The federal and provincial governments should encourage and assist in the redirection from commodity lumber manufacture to specialty remanufactured (value-added) products.

Introduction

I. INTRODUCTION

The British Columbia solid wood products sector of the forest industry is a well developed, mature and technologically advanced industry characterized by an infrastructure largely directed and oriented to worldwide marketing, sales, distribution and mass production of commodity lumber grades. There is an increasing recognition that while in its present form, the industry faces real constraints to further growth, significant opportunities exist to achieve added profitability from the present timber resource through development and implementation of strategies and programs directed to the marketing and manufacture of higher valued-added products. Indeed, major initiatives have been, and are being, undertaken by primary lumber producers and independent remanufacturers to further develop specialty wood products. The extent and nature of these initiatives vary depending on opportunity awareness, raw material supply, financial resources and marketing depth and expertise.

It is, within this 'opportunity' context that the provincial and federal governments, through the provisions of the Industrial Development Agreement, have commissioned this major study of value-added opportunities. The broad objectives are to:

- define and quantify the specialty wood products industry within the spectrum of primary producers and independent specialty remanufacturers;
- identify and assess existing and potential opportunities for, and constraints to, continued growth;
- develop practical strategic recommendations and program approaches to support further industry development;

The consortium of Deloitte, Haskins & Sells and Carroll-Hatch (International) Ltd. together with Mr. H. Edward Manning, (past Chairman of the Council of Forest Industries of British Columbia) has conducted the study through all major phases of work to meet the above objectives. This report sets out our findings and recommendations.

A. BACKGROUND

British Columbia is a leader in world manufacture of solid wood products with annual production of lumber in excess of 13 billion board feet and major markets in the U.S.A., Canada, Japan, United Kingdom (U.K.) and the rest of the European Economic Community (EEC). (1986 data)

Lumber production from the diverse species and grades of the provincial resource comprises a variety of products ranging from relatively low valued commodity grades produced through high production, low cost processing facilities to high valued specialty products. The commodity products, largely graded for the construction building industry, compete in mass markets with other sources of lumber throughout the world as well as with competitive products made from other materials. While the commodity products are aimed at undifferentiated markets, specialty wood products are essentially "niche" oriented with specific end-uses, precise customer product and quality specifications with relatively smaller markets.

In response to competitive forces, rising costs and supply limits on economic fibre, the forest industry has emphasized a mass production, low cost, commodity oriented strategy. Green coastal common lumber has been directed to waterborne markets such as the eastern United States (U.S.) and U.K. markets with dried Interior mixed species production largely destined for U.S. rail shipments. In the process, production has been increasingly concentrated in the Interior which now accounts for 72 percent of total provincial manufacture (1986). The marketing, distribution and supply practices of the lumber industry have been shaped to the mass production, commodity oriented process.

A substantial part of the industry has yet to recognize that it cannot remain commodity oriented and remain competitive in the long term. The coastal sector, in particular, is experiencing escalating wood costs and a decreasing supply of high quality, economic fibre. It is estimated however, that the coastal industry, with improved cutting practices, can greatly improve the fibre recovery in higher grades and the value of specialty products from the log. This also applies, to a lesser extent, to Interior production.

The recent thrust of the specialty wood products manufacture has been to "bridge the gap" between the commodity products of the primary sawmill and the product requirements of the end user. This has been done by utilizing a primary lumber product and further processing it to increase its value by producing a higher quality of product or a more useable component for industrial or secondary end-use manufacturers.

Special product manufacturing capacity to add value to the products of the primary industry has not yet been developed to any large degree in British Columbia. This has been largely due to a reluctance of the primary processors to implement a change of direction from a "volume to value" strategy which in turn, is due to perceptions that there is not a clear "business case" to do so. The constraints of small and specialized markets, the necessity for more entrepreneurial management infrastructures, the need for attention to detail, the seemingly adverse impact of specialty production on mass production economics, or added costs, are cited as major factors.

B. STUDY TERMS OF REFERENCE

The study objective, terms of reference and scope of examination are defined as follows:

1. Objective

The primary objective is to develop a comprehensive and practical strategy to further develop value-added manufacture and marketing of solid wood products from the timber resource of the province.

2. Terms of Reference

The study is intended to:

* establish a definitive understanding of the solid wood specialty products manufacturing industry in terms of its present economic significance in the overall British Columbia forest products industry, and to define the nature and extent of this industry in relation to the primary and independent and remanufacturing processes;

* model and demonstrate the economic/financial benefits to be gained through specialty products manufacture;

* provide a summary of market influences on specialty wood products;

* determine a basis for cooperation and coordination between the primary and independent remanufacturing processes of the wood products industry;

- present a pragmatic strategy for the enhancement of the value added concept of solid wood products.

- suggest methods which will expand the market to accommodate the additional volume of specialty wood products.

3. Scope of Examination

The objective and terms of reference have required that the following steps be undertaken:

- review and assess recent studies, analyses reports, background position papers and relevant industry statistics pertinent to the study objectives;

- conduct interviews with representative lumber and specialty products manufacturers together with associations and support groups such as shippers and wholesalers;

- define and quantify the industry in terms of production and employment to the degree possible;

- develop the "business case" for added-value production strategies considering various alternatives related to species, mill configuration, cutting programs, representative revenues, production costs, fibre recovery indices and alternative product out turns;

- identify and assess present industry strengths and limitations of value-added manufacture and examine the key external opportunities and constraints which will impact on future growth, strategic direction and change;

- develop strategies for implementation in terms of recommended policy, considering the fibre resource, tenure, raw material supply, products and production economics, public sector policy, markets, marketing and distribution, technological applications, research requirements, financial implications and industry infrastructure.

The report is presented by major sections which are organized to describe:

- the methodology or approach taken;
- the overall position of solid wood manufacture within the context of the world forest products industry;
- the evolution of the lumber industry in B.C.;
- the specialty products process;
- the factors effecting market and marketing of specialty products;
- the assessment of the industry to include opportunities and constraints;
- the examination of production strategies and alternatives;
- recommended strategic considerations for growth and development.

In a study of this nature directed to a resource industry such as forest products, it is unavoidable to use specific terminology and 'jargon'. As an aid to general reader understanding, a glossary of terms is included as Appendix I to the body of the report.

Methodology

II. METHODOLOGY AND APPROACH

In meeting the terms of reference, the study has been conducted in six key phases of work:

1. Review of relevant industry reports and statistics;
2. Definition of specialty wood products;
3. Identification of market influences and marketing needs;
4. Assessment of industry strengths and weaknesses as these are perceived to be relevant to the development of specialty wood products;
5. Development of representative "business case" models for the manufacture of specialty wood products considering various production and cutting program alternatives and utilizing appropriate revenue, cost, input and recovery indices to demonstrate the nature and extent of economic advantage;
6. Development of strategy to further the growth of specialty wood products to achieve greater "value" from the timber resource of the Province.

Throughout, project management has been facilitated through regular reporting to, and inter-action with the client Steering Committee comprised of federal and provincial government representatives.

The Committee has proved invaluable in acting as a sounding board at key stages of the project, providing liaison support, contributing to policy discussions and monitoring progress.

The approach to the conduct of work within each phase is briefly described in this section:

1. Review of Available Data and Industry Interviews

Initial attention was given to a detailed review of background studies and reports relevant to the study objectives. In addition, industry statistics were obtained from such sources as Council of Forest Industries (COFI), Statistics Canada, Madison's Lumber Directory, Ministry of Economic Development, and Ministry of Forests and Lands. Extensive discussions were held throughout industry, to include primary and independent specialty product manufacturers, public sector personnel, union representatives and industry support organizations comprising associations, institutes, marketing and distribution agencies. A listing of reference material is attached as Appendix 2.

2. Definition of the Specialty Wood Products Sector

The specialty wood products industry is diverse and has proved difficult to define. The remanufacturing activity itself is not uniformly understood either in terms of its scope and nature or its role and place as regards primary lumber processing and secondary end use manufacturing. The industry has been variously described, in terms of plant/product type oriented to lumber, specialty and wood components, and by a range of facilities, services and principal products which are further differentiated by species. Classification problems have also arisen in instances where primary producers further process lumber products which complicate attempts to clearly distinguish and segregate processing activities.

In this phase, the work has been to:

- develop a definition and classification of the specialty wood products industry to enable analysis and delineation vis-a-vis primary and independent specialty manufacturing;
- develop an historical perspective within which the solid wood industry has evolved from rough sawn timber to a multi-species industry with products in various stages of "further manufacture" to include both the Coastal and Interior industries;
- measure the present industry and the "extent of overlap" between primary and independent remanufacturer producers in terms of production, products, employment, regional and species concentration, etc.;
- develop a descriptive definition of the industry to include "value-added" concepts and types of remanufacturing.

Use was made of an industry questionnaire designed to elicit, on a confidential basis, data related to sales, products, production, employment and fibre procurement. The questionnaire (a copy is exhibited as Appendix 3) was distributed to all known specialty product manufacturers in the province. Telephone surveys were also used to provide production and product data particularly for primary processing. A major input to the study was the consultants experience and industry data base.

3. Identification of Market Influences and Marketing Needs

Attention has been given to a review of the type of marketing approaches needed for specialty products, the major influences which impact on marketing entry, penetration and competitive actions together with a broad analysis of market needs. The intent of the study has not been to conduct specific market research analyses of specific product ranges in market areas (this has already been started through the Council of Forest Industries (COFI) studies and other analyses) but to identify the "common threads" which must be recognized in strategic market development programs.

4. Assessment of the Present Industry.

Work was undertaken to identify, and assess present strengths and limitations as these currently impact on the industry's potential to realize value opportunities. The analysis considered key factors to include public sector policy, timber resources, manufacturing processes, raw material supply, products, marketing sales and distribution, technological application, research, industry integration and infrastructure. The assessment also reviews longer term and external issues which act as potential opportunities and constraints to growth.

5. Development of "Business Case" Models for Specialty Wood Products

A key consideration throughout the study relates to profitability and return on investment, i.e., does specialty product or value-added manufacture represent a commercially viable opportunity versus commodity oriented production cutting programs? Do production economics support this approach? What cutting programs should be used? Where should the priorities be placed? What are the capital implications? Attention was therefore given to the development of representative "business case" analyses to include the following representative species or species groupings:

- Coastal hem-bal
- Spruce-pine-fir
- Lodgepole pine

Use has been made of sawmill simulation modelling techniques with industry input data for current prices, costs, grade outturns and recovery indices. Alternative cutting programs or options have been evaluated within each of the above cases.

An analysis was also made of the hypothetical potential for added revenue on a provincial wide basis. For each major species, theoretical revenue improvement has been measured in terms of fibre recovery, grade recovery and product distribution using "no capital investment" and with "capital investment".

6. Development of Strategic Plan for Value-Added Manufacture and Marketing

From the above considerations and analyses, the key strategic issues and factors which require attention in coping with strategic policy have been delineated. Strategic recommendations are then set out by major policy areas and priority.

Forest Industry Perspective

III. FOREST INDUSTRY PERSPECTIVE

In this section, the extent and nature of the solid wood sector in British Columbia is set out within an overall context of the Canadian and world forest industry in terms of fibre resource, markets and production. Detailed industry statistics are attached as Appendix 4. The intent is to enable the reader to gain an overall perspective of the magnitude of the opportunities and issues addressed throughout the report.

A. BRITISH COLUMBIA IN A CANADIAN AND WORLD CONTEXT

British Columbia has a major presence within the world forest industry community.

* In a total context, Canada's 14 percent of the world growing stock is exceeded only by that of the Soviet Union. Growing softwoods in British Columbia account for 7.1 percent of the world total inventory and one-half of the Canadian softwood stock.

* The yearly harvest of softwood trees in British Columbia is 7.5 percent of the world softwood harvest and 45 percent of the Canadian total.

* Canada is the world's leading exporter of manufactured forest products accounting for 23 percent of the total and British Columbia at over 10 percent (of the world total).

* In 1984, Canada supplied 51 percent of the exported softwood lumber in the world. British Columbia accounted for 35 percent of the world export.

- British Columbia's lumber production accounts for 60 percent of all lumber manufactured in Canada.

It should also be noted that:

- The province has one of the finest softwood forests in the world in terms of quality, volume, species variety, density and grade characteristics.
- Steady growth in world consumption of softwood is projected through to the next century. Over the next dozen years, softwood lumber consumption is expected to increase at a rate of just under one percent per year. (FAO)
- The impact of foreign currency exchange rates on shipments of Canadian forest products to individual market areas is a major factor effecting market demand and industry profitability.

B. THE PROVINCIAL FOREST INDUSTRY RESOURCE

The forest industry produces a wide range of products including lumber, pulp, newsprint, plywood and other panel products and shingles and shakes.

In summary:

- The forest industry is the leading economic generator in the province accounting for 45 percent of total manufacturing shipments. Solid wood products constitute 58 percent of the forest product sector shipments.

- The industry directly employs over 78,000 people with annual wages estimated at $2 billion (1984). The largest employer of the industry is solid wood products manufacturing employing 50 percent of the above total.

- The commercial forest land constitutes about 27 percent of the total land base area of the province. Over 94 percent of the forest land in British Columbia is Crown owned under the jurisdiction of the provincial government.

- Mature standing timber volumes of all softwood species total 8.3 billion cubic metres. The volume of hardwood species is relatively minor. A resource map of the major provincial softwood species is shown overleaf. The distribution of inventory by provincial area and volume is also shown.

- The industry harvested 77.5 million cubic metres of timber in 1986. Coastal log harvesting was 34 percent of provincial log production with the Interior accounting for 66 percent.

- Timber losses due to fire, insects and disease are significant. In 1986, losses amounted to 33.5 million cubic meters equivalent to 40 percent of the annual harvest.

- About 97 percent of the timber harvested in British Columbia is processed domestically with 3 percent of the logs exported.

- There is a pattern of capital investment parallel to cyclical cash flow. Over $1.1 billion in capital and repair expenditures were spent in 1986.

FOREST COVER - MAJOR SPECIES GROUPS

Stocked productive forest land.

This describes seven major species groups in the province. Lodgepole pine (red) is by far the most prevalent species and is common throughout British Columbia with the exception of the west coast.

There is a total of 10 growth types used elsewhere in the Resource Analysis but only 7 are shown on the color maps. The whitebark pine, yellow pine, and larch groups are combined with other groups.

GRID DESIGNATIONS:

Fir	Douglas fir, larch, ponderosa pine,western white pine
Cedar	western red cedar, yellow cedar
Hemlock	western and mountain hemlock
Balsam	alpine, amabalis and grand fir
Spruce	sitka, englemann, black and white spruce
Lodgepole Pine	Lodgepole pine
Deciduous	alder, aspen, birch, maple and cottonwood
Nonapplicable	all other lands
Excluded lands	TFLs, TFs, major parks and private

ALLOCATION RULES

1) Pure species given total type area

2) Where two or more leading species occur, 60% of type area allocated to the first leading species and 40% of area allocated to second leading species.

Ministry of Forest and Lands - 1984 Resource Analysis

FOREST COVER - MAJOR SPECIES GROUPS

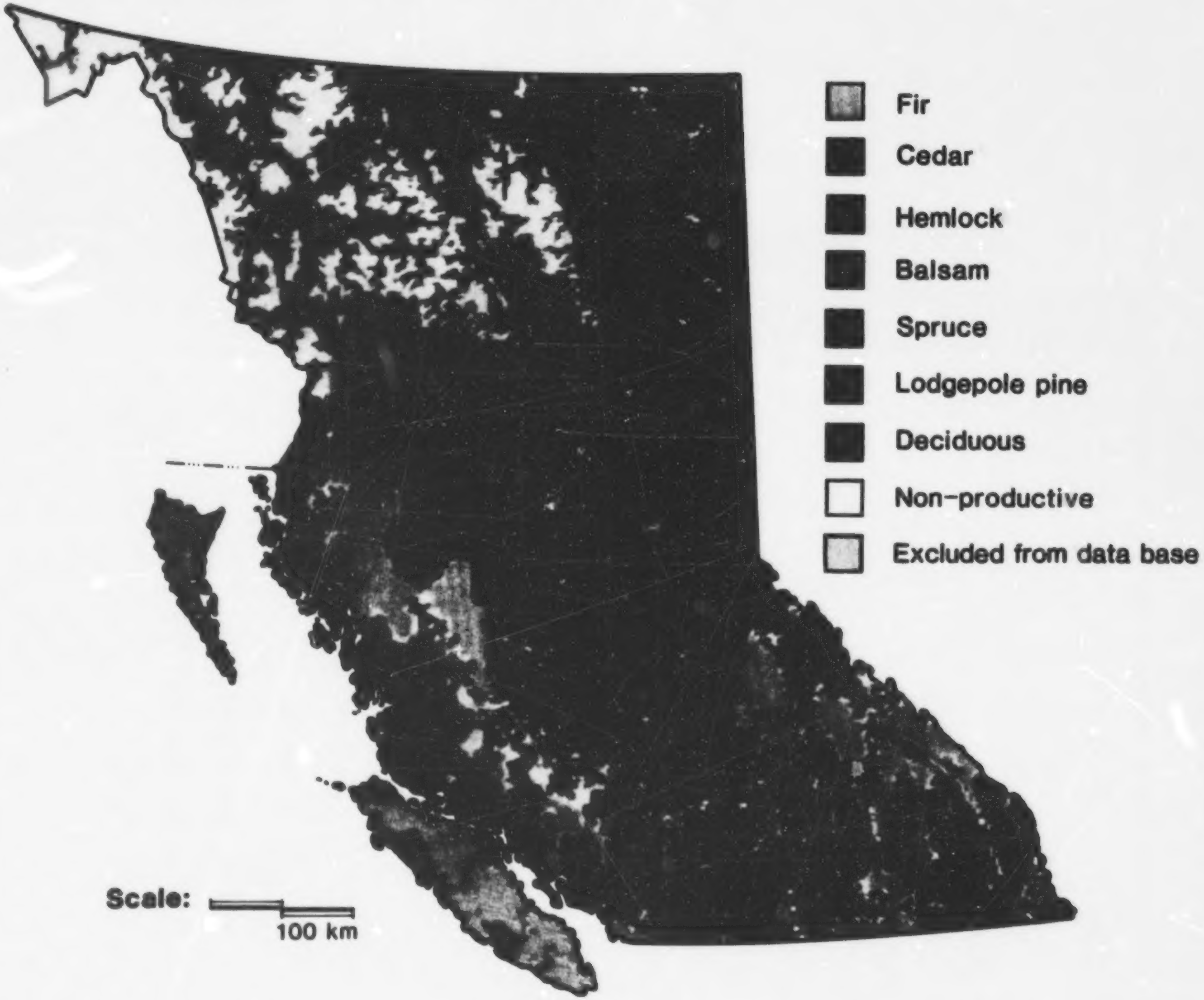

Fir
Cedar
Hemlock
Balsam
Spruce
Lodgepole pine
Deciduous
Non-productive
Excluded from data base
Scale:
100 km

Figure 2

Distribution of Area by Site

All TSA's

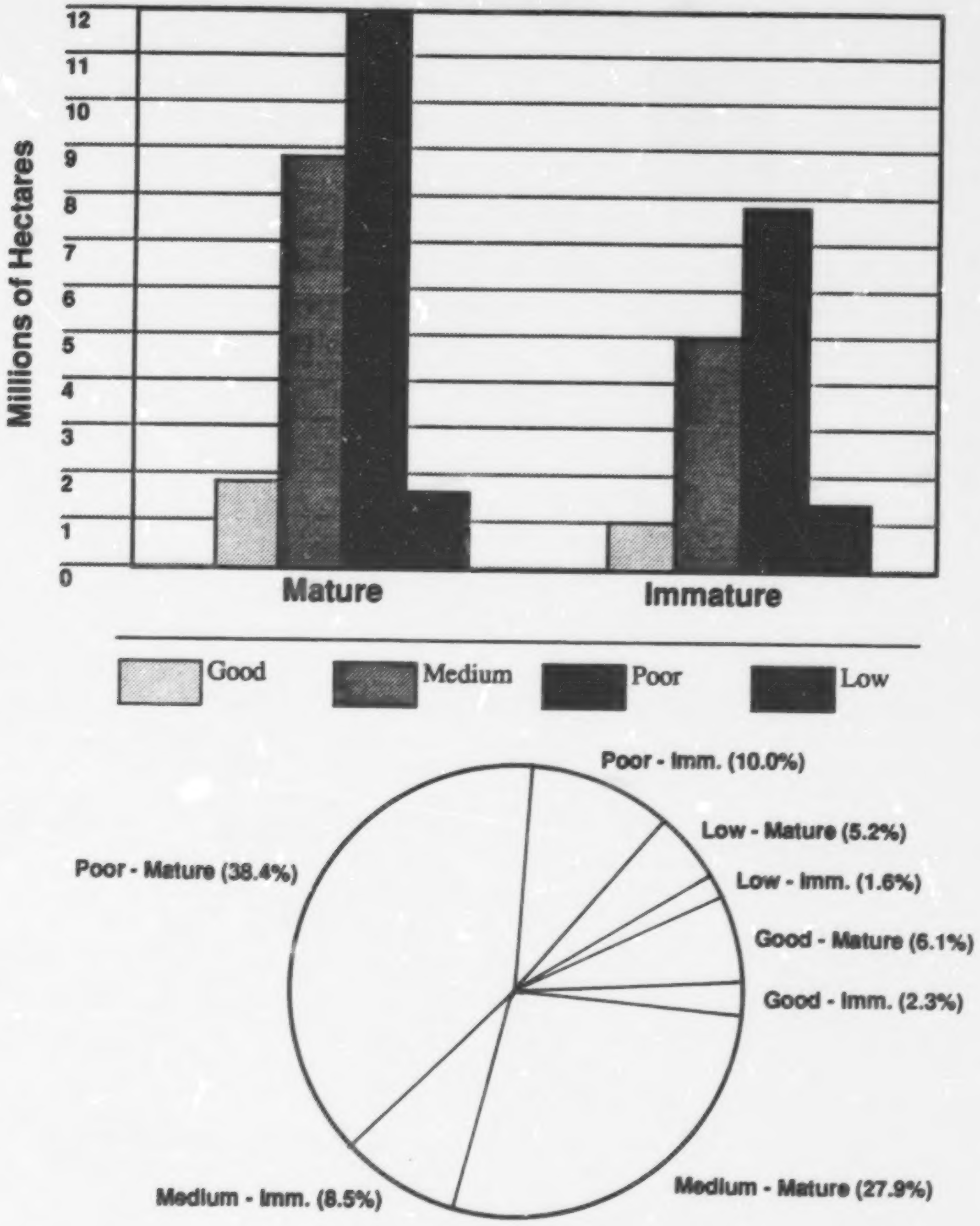
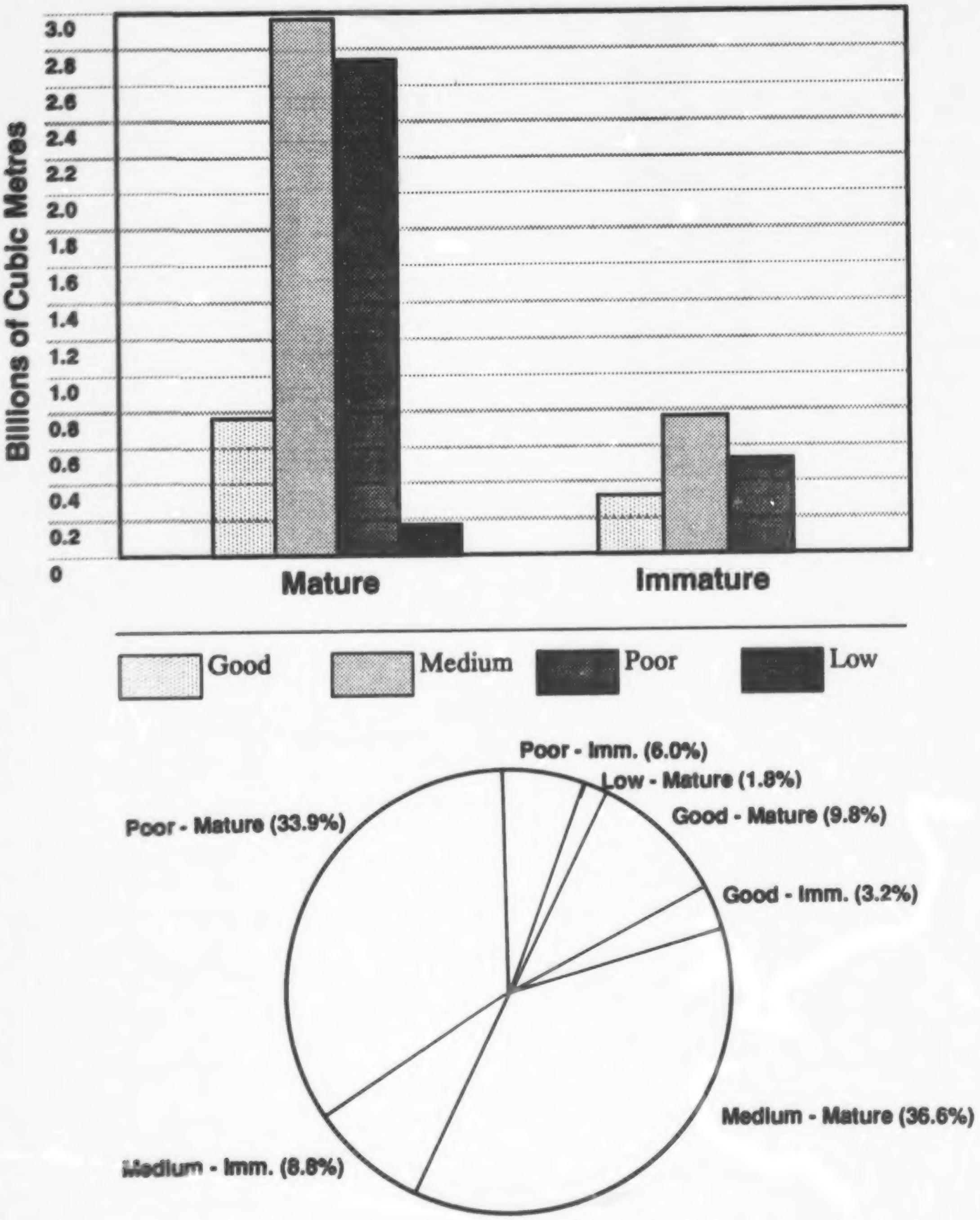


Figure 3

Distribution of Volume by Site

All TSA's



C. SOLID WOOD PRODUCTS

British Columbia is the leader in world exports of softwood solid wood products. The lumber sector is a key element of the total forest products industry.

In summary:

- lumber exports from British Columbia were valued at $3.0 billion in 1986, accounting for 44 percent of the total value of provincial forest product export shipments;
- provincial lumber production totalled 13.3 billion board feet in 1986;
- softwood lumber is supplied to the following major market areas.

TABLE I

1986 B.C. LUMBER SHIPMENTS BY MARKETS

	%	Volume MMfbm
U.S.A.	56.4	7811.2
Canada	30.0	4158.5
Japan	6.6	917.9
United Kingdom	3.8	530.5
Australia	.9	120.4
Other E.E.C.	1.4	195.5
Other Asia	.3	47.6
All other	.6	79.0
	100.0	13,860.6

- Over 6 billion fbm moved to market by rail in 1986, with a further 3.8 billion by road. Waterborne lumber shipments amounted to 3.7 billion fbm;

- Of the coastal timber harvest, 60 percent is processed in sawmills. Over 40 percent of coastal lumber shipments are exported to the U.S.;

- Of the Interior harvest, 85 percent is processed in sawmills and 80 percent of Interior lumber shipments are exported to the U.S.;

- B.C. lumber production is in four major groups of species:

		(Coastal %)
SPF	62.0%	
Hemfir	18.0%	(14.6%)
Western Red Cedar	9.0%	(6.9%)
Douglas Fir/Larch	9.0%	(4.2%)

- Interior lumber production, since the mid 1960's, has surpassed coastal production and is currently at 72 percent of total provincial production vs 28 percent on the Coast.

- End uses for lumber in the North American market are broadly classified by three major groups:
  - residential construction - 38 percent
  - repair, renovations and remodeling - 27 pecent
  - commercial, industrial construction - 15 percent

(There is a lack of industry data in terms of end use lumber statistics which limits analysis of this key area.)

In summary, the B.C. forest industry is a major force in Canada and internationally, not only effecting the provincial economy in terms of employment, capital investment and services, but also generating export revenue from the key market areas of the world. The industry has significant competitive advantages as these relate to the timber resource, invested state-of-the-art plant, skills of the labour force, manufacturing productivity and a developed supporting marketing/distribution/supply infrastructure. However, the industry is competing in a major world wide change environment which challenges (and will continue to challenge) the ability of the industry to fully capitalize on its advantages and position.

Evolution of Specialty Products

IV. HISTORY AND EVOLUTION OF SOLID WOOD MANUFACTURING IN BRITISH COLUMBIA

Since the middle of the 19th Century, when the coast lumber manufacturing industry commenced, it has been periodically and massively impacted by external forces.

Some of these forces have been destructive. Others have been beneficial. Whatever, they have occurred with such frequency and with such results, that the solid wood products sector of the B.C. Forest Industry is identified as cyclical, and that may be as much of an understatement as it is a cliche.

Price swings have been characteristic of the lumber industry throughout its history. Frequently, these have made long range planning a game of chance more than pure logic.

In his book, "Wood and Water", E.G. Perrault reports export sales from B.C. at $80.00 per mfbm in 1850 and in within ten years imports arrived in B.C. from Puget Sound (U.S.A.) (over 3 million feet) at $18.00 per mfbm.

One hundred years later, a sawmill in Vancouver harbour was putting whole logs into chips for the pulp industry because it was unprofitable to manufacture hemlock sawlog inventory into lumber.

Today, high grade Hemlock logs are being purchased by "Custom Cutters" for more than $800.00 per mfbm, whereas in the past decade there have been periods when Hemlock sawlogs cost more to buy than the selling price of the construction lumber they would yield -- not including the cost of manufacture.

Fortunes have been made and lost. Families have been uprooted. Communities have been organized, and then later turned into ghost towns. Complementary industries (pulp, newsprint, plywood) have been started and thrived and, in some cases, died. The lumber industry has survived, but it has changed, and it is those changes and the consequential effect of the complementary industries that have caused the evolution of the **Reman Industry** as we know it today.

The lumber industry was "born to export". When Captain Stamp and his successors started lumber manufacture, they had an ample supply of high quality timber and an export market. Over succeeding generations, there never was a period during which domestic consumption could equal the lumber production, and to survive was to export. Exports were the vis vitae which gave time for the industry to repair and to reorganize after each downturn.

However, when those exports were impeded, such as the imposition of the barriers to the U.S. market created by the Smoot-Hawley legislation, the industry had to find new markets for new products or die -- and many companies did.

The impact of this legislation on B.C. lumber exports can be illustrated by the following statistics selected from:

Source: Lands & Forests
Series K119-123 Principal statistics of woods operations, (1926 to 1959)

TABLE 2

PRINCIPAL STATISTICS OF WOOD OPERATIONS: 1928 - 1933

		Values in Thousands of Dollars			
Year	Employees (No. of Man-Years)[1]	Salaries & Wages	Cost of Materials	Net Value of Production	Gross Value of Production
1928	103,000	80,000	31,945	181,006	212,951
1929	97,000	80,000	32,938	186,632	219,570
1930	90,000	67,000	31,030	175,823	206,853
1931	52,000	37,000	21,170	119,954	141,124
1932	60,000	43,200	13,817	78,289	92,106
1933	65,000	46,800	14,067	79,706	83,773

[1] Man-year in British Columbia is 200 days; in other provinces 300 days.

Fortunately, in June 1932, the Imperial Preference Agreement was negotiated in Ottawa which permitted free trade on lumber within the British Empire, coincident with a 10% duty on the product from other countries. A change in manufacturing procedures was somewhat reluctantly adopted by the industry, but the resulting benefits of that agreement are illustrated by the following continuation of the preceeding statistics selected from the same preceding source:

TABLE 3

PRINCIPAL STATISTICS OF WOOD OPERATIONS: 1935 - 1940

		Values in Thousands of Dollars			
Year	Employees (No. of Man-Years)[1]	Salaries & Wages	Cost of Materials	Net Value of Production	Gross Value of Production
1935	79,000	60,000	25,629	89,832	115,462
1936	90,000	54,000	26,000	108,804	134,804
1937	100,000	60,000	31,486	131,764	163,250
1938	71,000	74,000	32,000	116,266	148,266
1939	75,333	79,000	34,000	123,747	157,747
1940	126,000	109,000	33,243	168,840	202,083

[1] Man-year in British Columbia is 200 days; in other provinces 300 days.

Up until the mid-40s, the industry was largely made up of family enterprises, a few of which controlled their own timber supply. Most were in an urban area, for example, False Creek and Vancouver Harbour; the Fraser River downstream from Maillardville; and in cities like Victoria, Sidney, Nanaimo, Port Alberni, etc. The lumber mill worker was the elite of the labour force of those days, and the key manufacturing jobs such as the sawyer, were paid three to four times as much as common labour. This permitted them to live separately and distinctly different from the run-of-the-mill labourer. It was commonly believed that a sawyer could "make or break" a company.

In the drive for overall higher wages, organized labour demanded and was awarded "cents per hour" increases rather than discretionary increases. As a consequence, the premium for highly trained talent disappeared and so did the desire to become highly trained. The "cost of labour" became the major factor in the planning and management of an enterprise.

Coincidentally, the urban environmentalists were becoming organized, and lumber mills with their refuse burners and many other ecological problems were no longer welcome.

The excess profit taxes of the war years 1939 - 1945 were an inhibitant to the rebuilding and renovation of the old sawmills.

Secure timber supply was becoming a recognizable "must" for the long-range planning of a corporation.

It must also be recognized that the generation of owner-managers, who brought these companies through the fifteen years following Smoot-Hawley and World War II, were tired and ready to convert their assets to cash. Only a few had successor generations who wanted to spend their money and future in an industry perceived at that time to be so insecure.

These were the companies who manufactured the full spectrum of grade from the magnificent "big old growth clear Douglas fir log". These were the companies who manufactured the specialty items: from door stock to mouldings, to lath to paving blocks and many other items, to enhance their average selling price.

Clear Douglas fir flooring and ceiling were major demand items. Many value added or remanufactured products were routinely produced and under Appendix 7, a copy of a Canadian Rail price list - 1940 is included to illustrate the wide list of products manufactured by the typical "full line" sawmill of the day.

The plywood process was developed. This deprived the sawmills of the best quality logs. At the same time the lucrative U.S. housing market requiring wood sought supplies from British Columbia. Gang rigs in sawmills became commonplace, and the objective became "labour saving" and "commodity manufacture". It was perceived to be too labour expensive to sort and select for the little clear wood that was forthcoming.

The millwork companies in Canada and abroad who bought clear fir lumber and manufactured doors, windows and a myriad of other wood items, were disappearing. They, too, were an urban anomoly. Specialists in the manufacture of doors or windows or mouldings appeared.

Patterns of trade changed. The "mixed carload" of product that was the typical order of the 30s disappeared, and was replaced largely with straight cars of commodity items -- indeed trainloads of commodity items into the U.S. housing market..

As profiles of product lines changed, so did channels of trade and attitudes towards markets and customer relationship became more price/commodity oriented. It is not purposeful to examine the industry prior to 1930 other than say it was a growing industry and had a satisfactory and ample supply of good raw material.

However, it is germane to look at the basic elements in certain different time frames. It becomes evident that the revitalization of the **Reman Industry** was born of necessity and evolved as a consequence of the fact of those elements.

Whether or not a piece of clear lumber -- or better phrased, the desired special piece of wood whether it be clear or not -- will be produced, has become a matter of grade and species of log available plus the cost of labour to select it.

The following figures put these factors in relationship in the different time frames.

TABLE 4

RELATIVE HISTORICAL STATISTICS

	High Grade Logs		Lumber Selling Prices		Base Labour Rate Not Including Benefits, Fringe or Trade Premiums
Year	Cost	Availability	High Grade	Construction Grade	
	$/mfbm		$/mfbm	$/mfbm	$/hour
1926	$ 26.00	Ample	$ 45.00	$ 20.00	.25/.40
1936	22.00	Ample	38.00	12.00	.49
1946	46.00	Reducing	45.00	18.00	.82
1987	650.00+	Scarce	1,200.00	400.00	14.50

During the past two decades, B.C. lumbermen have been travelling abroad, and have examined the lumber industry in countries not blessed with the high quality resource we once had here in abundance. In these countries, they have had to be inventive and create machinery that would manufacture wood in desired lengths and cross-sections from smaller pieces of wood salvaged from lumber without incurring intolerable waste. Their resource did not have an abundance of clear wood, and was too scarce to permit waste.

International buyers wanted their lumber supply to arrive in better condition and, furthermore, inland transportation costs had become too high to permit shipping the water resident in green lumber. Drying became a necessity.

Construction became technical and a piece of lumber had to be assigned identifiable structural qualities, and so machine stress rating became commonplace.

The down cycle for the solid wood industries in B.C., which commenced in early 80's lasted two or three years longer than expected and at it's nadir, there was a strong body of opinion, that it might not survive and that to survive, it must change.

This reached consensus in early 1983 and the trend to "further manufacture" to "added value products" gained momentum firstly amongst independent entrepreneurs in smaller operations, and then, gradually, through the management levels of the primary manufacturers.

Already incurred operating losses impeded the growth of specialty product manufacture within the primary sawmill industry but the urgency of necessity, has brought the broadening awareness, at all levels of ownership and management, of this alternative to the manufacture of commodities.

Changes are occurring on many fronts. There is now a new consensus. The industry must return to its entrepreneurial origins and widen the spectrum of its product line. Further refinement in manufacturing has become essential, and custom drying companies, custom planers, custom sorters, and others have developed into a Reman Industry.

The reduction of the California redwood supply provided an opportunity for coastal cedar to be developed as an appearance wood. Today hemlock has become the "available species" and it is emminently suitable for the manufacture of specialty products.

In the Interior, the scope for grade selection, whilst not as great as Coast Hemlock is perceived to justify re-examination for specialty product opportunities.

Machines now exist that are capable of significantly reduced saw kerf, capable of electronically scanning for salvageable grade, electronic sorting, and even electronic assistance in planning manufacture from the size and length of the log through to control of sensitive and delicate equipment in lumber manufacture.

The Reman Industry has evolved as a result of shrinking availability of high grade logs and economic necessity. It can produce cross-sections of wood in length and grade, by putting little pieces together to make bigger pieces. It can cut, trim, or profile or select or treat or enhance wood to make it more saleable or to make it more facile for some secondary manufacturer to make it into a marketable specialty.

Just as the B.C. lumber industry has become aware of it's broader potential, foreign industrial users are becoming increasingly aware of B.C. as a source for their "further manufactured" wood requirements and the intercourse between the B.C. producer and his foreign buyer is extending down through management levels here, never before achieved or even contemplated in the past.

At this writing, the prognosis for development of the industry must be judged good but within this report we will identify caveats which, if ignored, could frustrate both the growth of this industry and its profitability.

Specialty Wood Products

V. SPECIALTY PRODUCTS MANUFACTURE - A GENERAL ANALYSIS

This section presents the specialty wood products industry in terms of a definition of the industry itself, its relationship with other processing sectors, the concepts and application of added-value and the extent to which the industry has been developed.

A. DEFINITIONS:

Four major processes exist within the solid wood products industry, namely:

Forestry and Logging Process: the sector that converts the standing forest to a log product that is suitable for further manufacture;

Primary Process: the sector that converts logs as a raw material into lumber, possibly including drying and dressing;

Remanufacturing Process: the sector that converts lumber as a raw material into a more finished state of lumber as a separate operation from a primary or secondary operation;

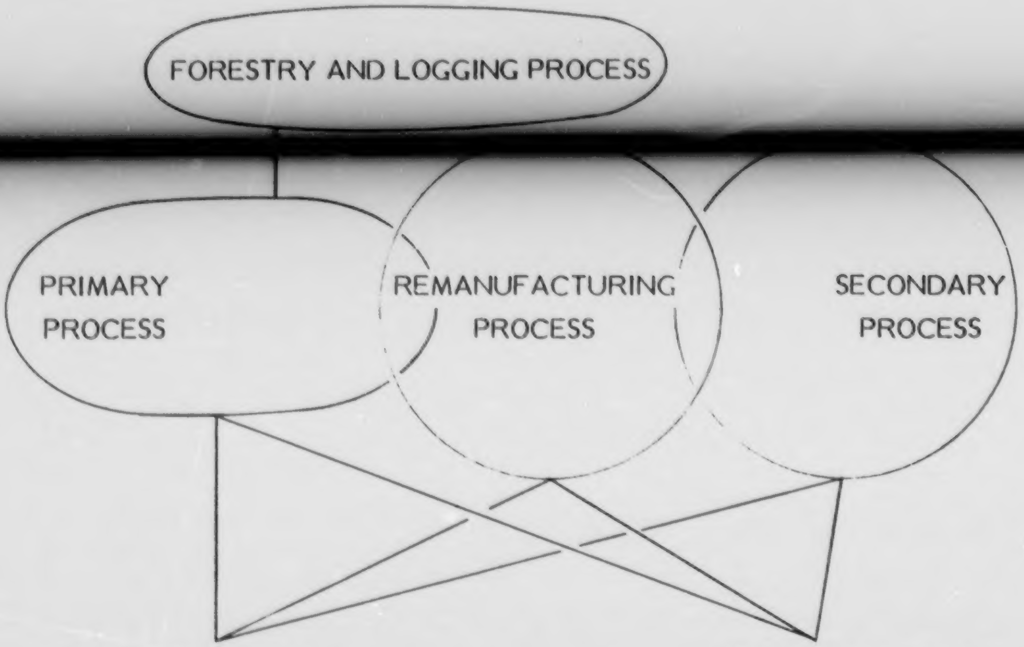
Secondary Process: the sector that converts lumber or uses lumber to make a finished, marketable product such as doors, windows, furniture, trusses, pallets, etc.

A variety of products are produced in each of the above processes. In Figure 4, product and process relationships are shown in a schematic form.

Numerous definitions exist to define the processes and the products for 'added-value' content. Throughout this report emphasis is not given to the process definition but rather to the concept of product marketing, whether it is a commodity product or a value added or specialty product.

Figure 4

PRODUCT AND PROCESS RELATIONSHIPS


FORESTRY AND LOGGING PROCESS
PRIMARY PROCESS
REMANUFACTURING PROCESS
SECONDARY PROCESS

COMMODITY LUMBER

- Dimension
- Studs
- Timbers
- Clear
- D or 4 Clear
- Railway Ties

SPECIALTY LUMBER

- Siding
  - Channel
  - V Joint
  - Bevel
- Boards
  - Finish
  - Panelling
  - Flooring
  - Shelving
  - Fencing
  - Crating
  - Pallet
  - Pattern
- Cutstock
  - Door
  - Window
  - Spindles
  - Turning Squares
- Edge Glued
- Finger Joint
- Cross Arms
- Mine Timbers
- Veneer Slicing
- Boxes
- Core Stock
- Laminated Stock
- Pressure Treated Lumber

← MSR Lumber →

1. Forestry and Logging Process

The forestry and logging process is perhaps the most important manufacturing process in the solid wood conversion. In this process, logs of different grades are produced that are suitable for further manufacture or processing in existing plants.

Specialty product manufacture must begin in the forest, with the manufacture of logs. There exists in the logging process a number of opportunities to manufacture logs of different value for different end-product use considering all the physical attributes of the stem or tree. For example, physical characteristics such as species, diameter, limbs, rot, shake, breaks, crook, flare, taper and ovality must be considered for location on the stem to optimize the log manufacturing for length. Substantial increase in value can be accomplished with improved log manufacturing. Education and better quality control practices are indicated.

Over ten percent improvement in log value, after considering all costs are common by improving education and quality control.

Recent innovations in manual bucking now provide portable computers to be carried in the field to assist in making better decisions on bucking procedures. Real time software programs are now available for bucking optimization in mechanical log merchandizing operations.

2. Primary Sawmill Practice

In the primary sawmilling sector, the sawmill must convert round logs of different sizes and qualities to square or rectangular lumber products. A large percentage (varying with each species and geographical location of the material) of this lumber product from a log yields a commodity construction grade. Primary sawmills are designed and obliged to efficiently mass produce to a limited range of size specifications and quality classifications or grades.

British Columbia's sawmilling industry, and especially the coast, has competition in the North American and export markets for [illegible] grades that represent the majority of present production. To compete, it is necessary for continued major capital investment to be directed toward improved logging and primary production techniques. In most cases the streamline and automation involved is inclined to make a primary mill less flexible in both the size and grade quality ranges. It behooves the primary manufacturer to reduce costs, improve volume production, while at the same time adding more value to the production facility.

Just as primary sawmills in British Columbia must limit the number of sizes that are produced in the primary sawmill, there are limitations on the number of grade sorts that can be made in a mill. While effort can be made to recover value, the entire system cannot be specific enough to freely target a wide range of specialized products required by end users.

By the nature of this mass production and economic process the higher value and more specialized grade and/or products develop from the mass production. Most of these sizes are not immediately useable by the industrial manufacturers of specialty wood products; they must be further processed before their ultimate end use. Generally, this conversion from one size to another size results in a volume falldown.

It is suggested that the objectives in the primary breakdown of a log and the concepts of volume versus value must be integrated to provide a more profitable resource industry. It is possible that a major portion of such value added production can be achieved to make the industry much more profitable with proper planning, integration, and minimal capital investment.

lack of understanding and integration of the concept within the industry. It is noted that while many companies can see the need for specialty product manufacture in a broad general perception, not many firms have the scope of markets, production items, production volume to justify investment in it. Instead they are more concerned about upgrading their main logging or primary process to remain competitive by reducing costs and improving the volume production. This is not to imply that various firms, both independent and primary manufacturers, do not have the remanufacturing facility. However, most of these remanufacturing facilities have a number of inadequacies that limit that growth and profitability. Primary owned remanufacturing facilities are sometimes shipping an ungraded product, a problem for them to solve. These plants are still production oriented without a market orientation. Many plants have skill problems and productivity problems due to constraints in union agreements or employee restrictions. The true independent plants do better, and many have been profitable, but various analyses of the current capacity show a lack of adequate facility, buying power and/or marketing scope to effectively grow and profit from current and future potentials. In the majority of cases, local plants are manufacturing a single lumber product, i.e., wall paneling, or catering to a limited market sector, i.e., panel blanks, door components, and have limited market entry to the more lucrative export markets.

The limited facility of primary sawmills in product production and sort facility also provides a source for a remanufacturing plant. Most primary mills are limited, in their planing, resawing, drying, and sorting capacities leaving large volumes of commodity items to be custom planed, resawn, dried etc. This primary sawmill need for remanufacturing requires custom processing capability in established plants. An added bonus to the remanufacturer is the

The integration between the primary sector and the reman sector is paramount to the success of specialty product manufacturing. By changing basic cutting programs or cutting methods in the primary sector, maintaining volume oriented minimal cost production plants, by producing large or specialized products for further remanufacturing, the profitability of the total industry can be improved. This approach is attempted in section IX of this report to show the effect of integration. The overall production of specialty products is market driven and it can also be said that the primary sawmill cutting programs as outlined in the log, will dictate the success of the specialty product manufacturing process. Without doubt, our forest industry must become much more market driven for all its products and recognize the role that our products play in an international world market, and price them accordingly.

It should also be recognized there is a fair amount of grade overlap, in coastal commodity grade and upper grade. A utility grade construction lumber commodity product quite often will yield #2 or #3 shop from which specialty products can be produced. It is suggested that improved grade recovery in the primary process can greatly improve the specialty product manufacture and the profitability of the industry with little if any capitalization. An indicated approach is that production of this shop grade instead of utility grade lumber can greatly enhance the value of fibre.

3. Remanufacturing

Remanufacturing involves some form of processing a primary lumber product to add value. The process can be simply sorting of the primary lumber product or any combination of sorting, drying, resawing, dressing, ripping, cutting, finger-jointing, edge gluing, and packaging operations.

As stated previously, the role of remanufacturing or secondary wood manufacturing is to bridge the gap between the commodity or semi-processed products of the primary sawmills and the specialty product requirements of the end user.

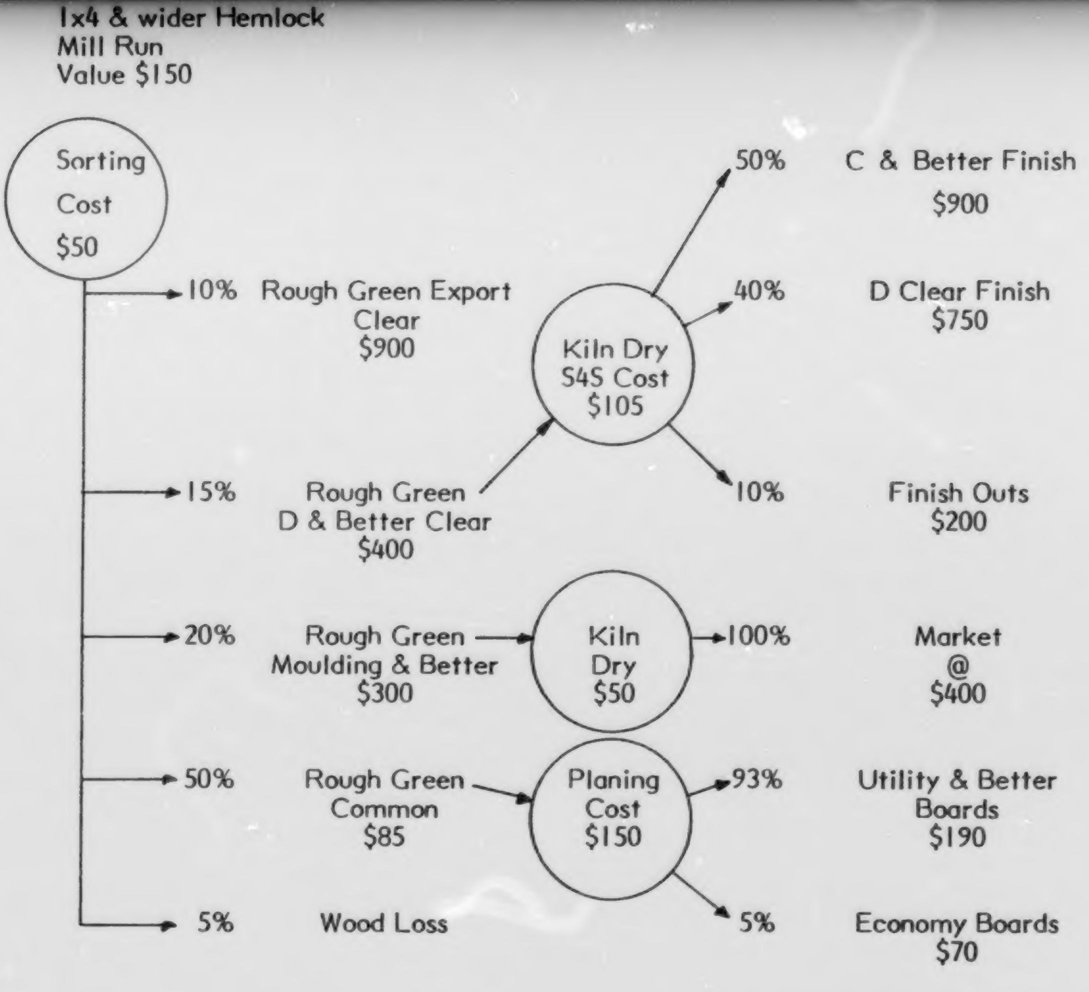
Specialty products comprise a wide variety of items with specific characteristics tied to end user requirements and relatively limited demand spread over a wide market. The industry requires flexibility in production scale, specialization in processing, close attention to all aspects of materials utilization and clear communication links between producer and end user. These requirements are very dissimiliar to the production, supply and marketing practices required of mass volume commodities which, in turn, require a different strategy.

The following example illustrates a simplified remanufacturing run that demonstrates, by further processing and sorting various grade outturns, how the value of the fibre output can be significantly improved.

Figure 5

ONE EXAMPLE OF REMANUFACTURING PROCESS ANALYSIS

The unit values are representative only and intended to demonstrate the concept of added value through further processing.


1x4 & wider Hemlock
Mill Run
Value $150
Sorting Cost $50
10%
Rough Green Export Clear $900
15%
Rough Green D & Better Clear $400
20%
Rough Green Moulding & Better $300
50%
Rough Green Common $85
5%
Wood Loss
Kiln Dry S4S Cost $105
50%
C & Better Finish $900
40%
D Clear Finish $750
10%
Finish Outs $200
Kiln Dry $50
100%
Market @ $400
Planing Cost $150
93%
Utility & Better Boards $190
5%
Economy Boards $70
2%
Wood Loss

Finished Value	$375.60
Total Costs	$300.75
Potential Profit	$ 74.85

In this example, original lumber product valued at $150 is processed through a number of additional operations concerned with value and at an overall incremental cost of $100.75, will realize a profit of $124.85 after fibre loss.

In remanufacturing or specialty product manufacturing, five types [illegible] have evolved and are recognized as follows.

a) Some of the major primary producers have embarked on independent programs of specialty product manufacturing and as such, have built remanufacturing facilities to produce specialty products.

b) Individual entrepreneurs have recognized opportunities that exist in producing specialty products, and have proceeded to develop their own markets, build their own facilities, and purchase their own raw material on a market basis from either a primary producer or a wholesaler.

c) The custom processor works material on a custom basis for some primary cutter, or a wholesaler, and is purely a production-oriented facility. The primary cutter or wholesaler purchases the wood and markets it. The custom processor simply processes the wood to the clients' specifications. Some of the larger and more successful remanufacturers operate in this category.

d) The fourth type of remanufacturer is generally known as a "scavenger" type operation. This term is not intended to be derogatory, but reflects that this entrepreneur recognizes opportunities available in the processing of into a higher value product, or a combination of products, markets it and obtains a satisfactory gain. A number of these products that he purchases from the primary manufacturer are a result of the lack of grading and/or sorting facilities available in an existing primary facility. However, when the primary producer recognizes the improvements and opportunities to be gained by being able to process wood further, he will improve his operation. As a result, the raw material availability and low cost product will no longer be available to the "scavenger" remanufacturer, who will find much tighter wood supply and/or higher price.

e) The fifth remanufacturing facility is a joint venture where a customer recognizes the need for remanufacturing some form of lumber to his requirements and as a result either joint ventures or builds his own remanufacturing facility either separate or in conjunction with his secondary or finishing facility. Currently some joint venture interest is shown by offshore secondary customers building some remanufacturing facilities in British Columbia to secure or control more fibre supply and products suitable for their needs.

One must recognize that the industry has not defined clearly the process terminology of remanufacturing, i.e. often **remanufacturing** and **secondary manufacturing** are used for the same process. Product differentiation is also very confused.

Another approach to more adequately convey the basic philosophy or industry 'culture' that is being analyzed is to investigate the 'commodity' product and the 'value-added or specialty' product.

Commodity Product

Commodity product is a generalized term.

The assumptions or implications of commodity product trading are generally:

- the product is categorized or graded to some rule;
- the product is distributed in mass or large volumes;
- a number of distribution functions are required to service the large economies of scale;
- price lists of the commodity products are widely circulated;
- very often, the people involved in buying and selling the product never see the product;
- the product is mass produced for production efficiencies;
- the price for a product is generally well established. Competitive advantage is gained through production efficiencies or distribution methods;
- selling predominates. Little marketing occurs;
- the product distribution is accomplished by using inventories;
- minimal customer/producer interface occurs.

Value-Added Production (Specialty Product)

Value-added is a generalized term referring to specialty product manufacture where additional operations are performed to a product incurring added costs to make a product of higher value. The purpose of **value-added** is to make a higher net return after costs.

The assumptions or implications of the **value-added** product or specialty product manufacture are generally:

- more operations will be performed on the product, thus requiring more people and/or creating more employment;

- specialty product manufacture requires a different form of marketing and selling than that used for a commodity product;
- specialty product manufacture can be highly labour intensive depending on the product;
- specialty product manufacture should provide a higher net return to the resource owner;
- raw materials are usually the key element in cost of manufacture. Effective materials management is essential to profitability;
- specialty product manufacture should provide a higher return after costs to the manufacturers than commodity manufacture;
- specialty product manufacture requires better communication between the producer and the end-user than commodity processing;
- specialty product manufacture generally demands much more rigid quality control in production;
- specialty product manufacture implies a high degree of service between the producer and the end-user.

B. ESTIMATION OF SPECIALTY PRODUCT MANUFACTURE

A key requirement of the study is to define and estimate specialty products manufacture within the solid wood sector. Reference was made earlier to the study of available industry statistics and the use of a questionnaire designed for obtaining data from the [illegible] direct enquiries to the industry.

A current listing of B.C. primary and specialty product manufacturing companies is attached as Appendix 6.

Summarized information based on 1986 data is as follows:

Table 5

SPECIALTY PRODUCT MANUFACTURE *

	Primary Process		Independent Remanufacturing Process (includes custom cutting programs)	
	Annual MMfbm	No. of Plants	Annual MMfbm	No. of Plants
Primary Production Capacity	16,015	218		
Annual MMfbm Production	13,300			
Specialty Product Production	755	46	1,543	149
Average Plant Size (MMfbm/annum)	73.47		10.35	
Total MMfbm Specialty Products		2,298		
% of Total Production Capacity		14.3		

* Compiled from questionnaires, telephone survey, directories, industry statistics, and proprietary corporate information.

The total of 2.3 billion board feet of specialty product manufacture represents 14.3 percent of the total provincial lumber production capacity. The primary producers directly account for 33 percent of this amount.

Table 6

EMPLOYEE STATISTICS

	Primary	Remanufacturing	Separate Remanufacturing as % of Total
No. of Employees	18,768	2,861	13%
[illegible]	[illegible]	$108,047,000	11%
Average Hourly Wage	$15.99	$15.41	

Compiled from Government Agency Data Base 1986.

There are currently approximately 2,800 personnel directly employed in remanufacturing. It is noted that the average hourly wage approaches that of the primary industry.

Table 7

SPECIALTY PRODUCT MANUFACTURE BY REGION

	Primary Process			Independent Reman Process	
Region	No. of Plants	Annual Capacity MMfbm	Specialty Product Annual Production MMfbm	No. of Plants	Annual Production MMfbm
CI	78	7,708.3	102.5	15	122
I	72	3,572.7	136.0	31	128
LM	40	2,650.1	458.2	91	1,202.2
VI	24	2,043.6	55.0	12	90.6
SC	3	39.6	3.2	-	
NC	1	1.0	-	-	
TOTAL	218	16,015.3	754.9	149	1,542.8

CI	Central Interior (North of Kamloops)
I	Interior
LM	Lower Mainland
VI	Vancouver Island
SC	Sunshine Coast
NC	North Coast

There is a concentration of specialty product facilities in the Lower Mainland, i.e. 91 plants accounting for over 72 percent of total production.

Table 8

SPECIALTY PRODUCTS MANUFACTURE BY SPECIES AND REGION *

REGION		SPF	HEM	DF/L	WRC	S	YC	LP	TOTAL
CI	Reman	65	-	-	28	-	-	29	122
	Primary	78	-	-		5		19	102
I	Reman	49	-	29	34	-	-	16	128
	Primary	3	-	13	88	-	-	32	136
LM	Reman	46	577	99	432	33	15	-	1,202
	Primary	-	15	-	443	-	-	-	458
VI	Reman	-	53	12	26	-	-	-	91
	Primary	-	-	-	55	-	-	-	55
SC	Reman	-	-	-	-	-	-	-	
	Primary	-	3	-	-	-	-	-	3
TOTAL	REMAN	160	630	140	520	33	15	45	1,543
TOTAL	PRIMARY	81	18	13	586	5		51	754
% of PRODUCTION		10	28	7	48	2	1	4	100

* Production figures are based on plan volumes and include some double counting where wood is processed in two or more facilities.

The Western Red Cedar specialty industry is relatively mature and developed.

Table 9

PRIMARY PRODUCERS BY PRIMARY MILL PRODUCT PRODUCTION

Production Range	Number of Mills
1.0 to 20 MMfbm	73
20.1 to 50 MMfbm	24
50.1 to 100 MMfbm	51
100.1 to 150 MMfbm	40
150.1 to 200 MMfbm	23
200.1 MMfbm plus	7
Total:	218

Table 10

PRIMARY PRODUCERS BY MILL SPECIALTY PRODUCT PRODUCTION

Production Range	Number of Mills
1.0 to 10 MMfbm	28
10.0 to 20 MMfbm	8
20.1 to 30 MMfbm	1
30.1 to 50 MMfbm	4
50.1 MMfbm plus	5
Total:	46

Table 11

REMANUFACTURE BY MILL PRODUCTION

Production Range		Number of Mills
1.0 to 10 MMfbm		103
10.1 to 20 MMfbm		21
20.1 to 30 MMfbm		15
30.1 to 50 MMfbm		8
50.1 MMfbm plus		3
	Total:	149

The preceding tables demonstrate the size of remanufacturing plants relative to primary lumber mills.

Table 12

B.C. LUMBER AND SPECIALTY PRODUCTS PRODUCTION BY SPECIES (1986)

Species	Coast Lumber Production (MMfbm)	Coast Lumber %	Interior Production (MMfbm)	Interior %	Provincial Total
Douglas Fir/Larch	559.4	15	658.4	7	9
Western Red Cedar	926.0	25	225.5	2	9
Yellow Cedar	139.1	4	3.0	-	1
Hem Fir	1960.1	52	386.	4	18
Sitka Spruce	125.3	3	10.7	-	1
SPF	42.8	1	8272.3	86	62
All other	0.3	-	25.5	-	-
	3753.0	100.0	9581.6	100	100

		% Total Production		% Total Production
Specialty Products	1809.2	48.2	488.5	5.1

Specialty products manufacture is a developing industry on the coast. Interior production is only approximately 5 percent of total current lumber output.

E. REMANUFACTURING IN OTHER REGIONS

Industrialized regions in the world have markedly different approaches to lumber processes and marketing. In this section, Japan, Sweden and the United States are discussed.

In Japan the processing and marketing of lumber products is much different than in British Columbia.

- The mills reflect a relatively low level of capital investment and are simple in configuration.
- The mills run a particular or specifically sorted log already trimmed to length. Few trimmers exist in the plants.
- The mills are generally owner operated, small size, and produce lumber slowly and precisely.
- Land and utility cost are high and increasing.
- Mills produce many sizes but few different grades. Lower grade products are broken down to smaller sizes to extract quality products.
- Primary breakdown units produce end use product with minimal if any remanufacturing or grade separation.
- Products are marketed directly to medium size and small end users. In general, fibre recovery and quality product production are emphasized.

In Sweden the lumber processing philosophy is again different to British Columbia or Japan.

* The forest industry is much older in Sweden.
* The primary producer generally markets his product directly to the secondary or finishing plants in lumber forms.
* Upgrading or remanufacturing of the lumber has traditionally been done in the secondary operation.
* The primary breakdown mills are small to medium size and highly capitalized.
* The log supply to the mills is well sorted and manufactured.
* Many mills merchandize their log supply and then run logs sorted for diameter and length.
* There is some change in process in Sweden in which the primary sawmills are cooperatively remanufacturing some of their product before selling the fibre.

A paper presented to the 1988 Portland Sawmill Clinic is attached as Appendix 7 which describes the European experience in specialty product manufacture.

In the Pacific Northwest of the United States a slightly different approach is made with remanufacturing.

* The primary sawmilling industry is very similar to British Columbia.
* The secondary processing is well developed east ot the Cascades as a result of the Ponderosa Pine industry and product use.

- This secondary processing has created some facilities and operating environment west of the Cascades in the Douglas fir country.
- The secondary processing has evolved in generally a low labour cost environment.
- The requirement for improved profitability of the primary operation has forced the development of remanufacturing facilities. A substantial volume of lumber processed in these remanufacturing plants originates in British Columbia.
- There are indications of Canadian investments locating remanufacturing facilities in U.S.A. rather than in British Columbia.
- Some of the product from the American Pacific Northwest remanufacturing industry flows into Canada, some of which is from fibre originating in British Columbia.

Market Considerations

VI. MARKETS

The production of specialty products in the forest industry in British Columbia is, and will continue to be, driven by the market and its capability to absorb production. In other words, the customer and his demand for his particular product and specifications, ultimately determines the production of specialty products. Unlike commodity products that are inventoried and sold in bulk, specialty products are produced for direct order files to very precise customer specifications. It is assumed and understood throughout this discussion that the need for much more direct customer-producer communication is inherent in the production of these specialty products.

A. INTRODUCTION

This study was not commissioned to conduct a comprehensive market analysis for specialty product manufacture. The discussion here attempts to provide an overview or broad understanding of the market and its influence on specialty product manufacture. Although the general premise is that a very large market exists for specialty products from the sawmilling industry in British Columbia, much market research needs to be done to define the best return for our product. In addition, a much better knowledge of true marketing, factors of competition and pricing must be better understood by the practitioners within the industry. Although some indicated volumes are presented, these numbers are presented only to demonstrate the relatively large potential for specialty product manufacture.

The sawmilling industry in British Columbia is processing a number of timber species that are found only in the Pacific Northwest of North America. Some of these species provide lumber products that range from cheap construction grades through to expensive defect free wood used for decorative and joinery end use purposes. Other species provide highly specialized wood fibre products that command premium prices within the world markets.

B. MARKET INFLUENCES

In investigating the market for specialty products it is evident that a number of major market influences are causing change in demand, the majority of which favour the use of British Columbia specialty products. In all cases improved marketing and market promotion are required for our products.

1. More processing can be done in British Columbia by **supplying an industrial blank** or remanufactured product instead of shipping a rough green product. The rationale relates to a number of products which are shipped off shore and processed with a resultant falldown, transportation of non-useable product and costs of disposal of the waste product.

   For example, ladder stock in 3 inch size is shipped to the United Kingdom to a ladder manufacturer as a rough green product. The ladder manufacturer rips the rails from the stock but recovers something less than 50 percent in the process. As a result he must find a market for the falldown product in non-standard sizes. In addition he must dispose of the waste at some cost. Transportation costs to the United Kingdom of a product in which only partial recovery is gained are also significant. The end result is that the economics are so poor that the competitive aluminum ladders can be produced more cheaply. However, if British Columbia could sort and grade and dry and produce ladder stock in British Columbia in a more finished form then this use of wood product may continue to be viable.

For many end product users, their own facilities are either outdated and require replacement, or are inadequate except for marginal increases in production. As a result, these end users are increasingly turning to the source of fibre supply and requesting material in more finished or component form. In many cases, premium prices can be paid for components or specialty products produced in British Columbia to the customers specifications with the necessary quality and service.

2. Throughout the world, especially in Southeast Asia, **the availability of hardwood roundwood is diminishing.** Supplies of hardwood roundwood species to Japan have been greatly reduced by countries such as Indonesia and the Phillipines. The following tables depict the changing hardwood and softwood log and lumber exchange.

Some species from British Columbia can compete in the replacement of this hardwood supply. For example, hemlock can be stained to resemble the various hardwood supplies in appearance.

TABLE 13

PRODUCTION/TRADE IN SAWNWOOD

Thousand m^3

		PRODUCTION	IMPORTS	EXPORTS
CANADA	1975 Coniferous	25,742	861	15,305
	Non Coniferous	973	440	160
	1980 Coniferous	42,895	670	28,966
	Non Coniferous	1,429	747	305
	1985 Coniferous	52,519	683	38,664
	Non Coniferous	1,384	632	271
USA	1975 Coniferous	61,867	13,314	3,248
	Non Coniferous	13,858	523	647
	1980 Coniferous	66,500	22,169	4,847
	Non Coniferous	17,221	675	885
	1985 Coniferous	72,367	33,744	3,555
	Non Coniferous	14,223	800	901
ASIA	1975 Coniferous	42,666	3,954	279
	Non Coniferous	34,841	1,426	3,485
	1980 Coniferous	51,067	7,435	597
	Non Coniferous	42,290	3,060	6,499
	1985 Coniferous	50,199	7,007	359
	Non Coniferous	49,614	3,471	6,317
EUROPE	1975 Coniferous	58,983	20,713	15,177
	Non Coniferous	16,500	3,806	2,356
	1980 Coniferous	70,374	28,048	22,186
	Non Coniferous	18,497	6,130	2,992
	1985 Coniferous	67,629	24,727	21,760
	Non Coniferous	17,929	5,490	2,579

SOURCE: FAO

TABLE 14

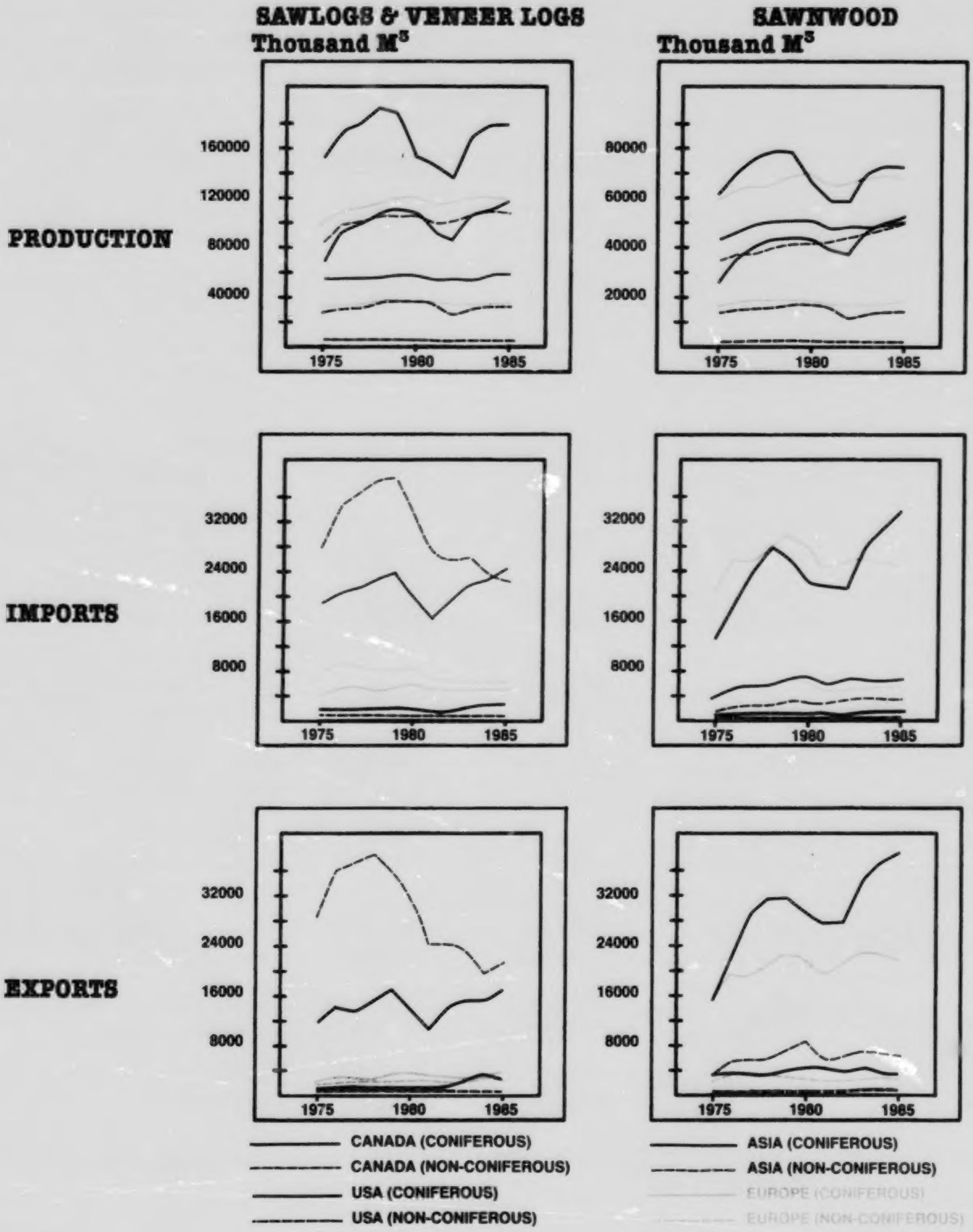
PRODUCTION/TRADE — SAWLOGS & VENEER LOGS

Thousand M^3

		PRODUCTION	IMPORTS	EXPORTS
CANADA	1975 Coniferous	69,332	1,417	377
	Non Coniferous	4,230	241	28
	1980 Coniferous	106,900	1,629	1,050
	Non Coniferous	5,965	410	97
	1985 Coniferous	115,996	2,516	2,414
	Non Coniferous	5,573	448	99
USA	1975 Coniferous	152,786	310	11,819
	Non Coniferous	37,241	61	688
	1980 Coniferous	154,081	517	14,084
	Non Coniferous	37,241	61	688
	1985 Coniferous	178,989	321	16,906
	Non Coniferous	32,721	504	
ASIA	1975 Coniferous	53,025	18,489	543
	Non Coniferous	82,781	27,501	28,238
	1980 Coniferous	57,096	19,433	425
	Non Coniferous	106,551	32,432	31,585
	1985 Coniferous	58,186	24,331	167
	Non Coniferous	106,847	22,458	21,145
EUROPE	1975 Coniferous	98,933	3,942	2,176
	Non Coniferous	33,206	7,396	1,933
	1980 Coniferous	122,405	6,094	3,854
	Non Coniferous	36,534	8,683	2,573
	1985 Coniferous	119,778	5,304	3,794
	Non Coniferous	35,249	6,191	2,583

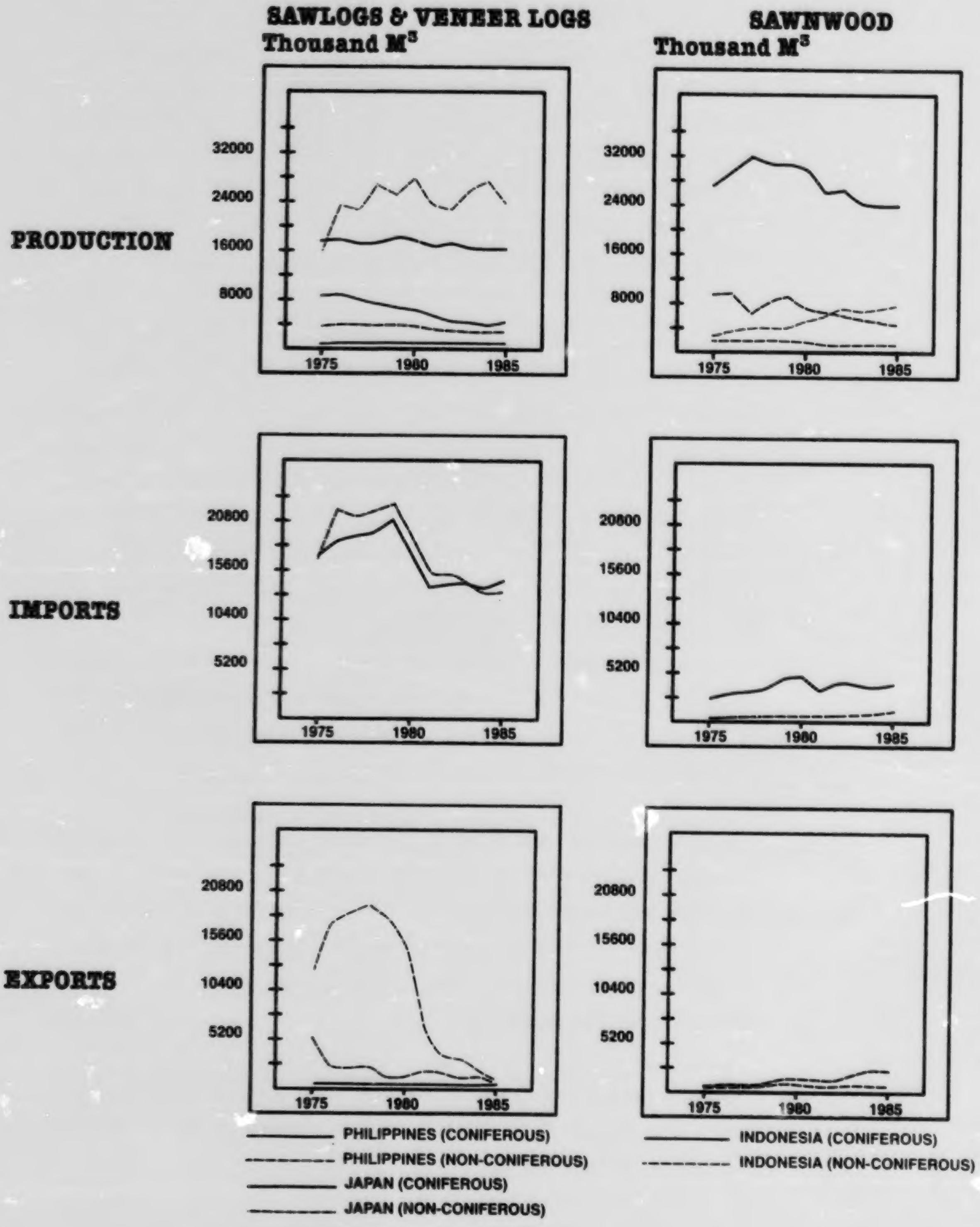
SOURCE: FAO

FIG. 6 PRODUCTION / TRADE IN SAWLOGS & SAWNWOOD FOR CANADA / USA / ASIA / EUROPE



SOURCE: FAO 1985 YEARBOOK OF FOREST PRODUCTS

FIG. 7 PRODUCTION / TRADE IN SAWLOGS & SAWNWOOD FOR INDONESIA / JAPAN / PHILIPPINES



SOURCE: FAO 1985 YEARBOOK OF FOREST PRODUCTS

3. The **replacement of other softwood species** is also occurring. In Scandinavia, they are processing a reported 7th forest and as a result, the quality of wood fibre is much reduced. Some estimates indicate that 6 million m^3 of joinery products have been marketed annually in Europe in the past from Scandinavia, but only 2.5 million m^3 of joinery products are available today. As a result, other sources of wood must be derived. Lodgepole pine from British Columbia can compete in this market as a replacement for "Swedish redwood".

4. Some markets have very specific **preferences for colour and clear appearances.** Some of the products from British Columbia are well suited to provide these preferred qualities and as a result can demand premium prices in the market place. Western red cedar, for example, has become a valuable decorative species in limited supply as a replacement for the California redwood species. Sitka spruce and yellow cedar have traditionally been sought by the Japanese market for decorative use because of their clear grade and light colours. More recently because of the promotion and shortage of supply, hemlock has been accepted in Japan for its light colour and clear characteristics. It is of interest that hemlock panelling is now regarded as a premium panel in certain parts of Europe.

5. The **shortages of wood fibre in other species are** forcing changes of secondary or finished manufacture to species like hemlock and lodgepole pine. The developing hardwood shortage and/or cost is forcing use of softwood species in joinery, furniture, doors, windows, etc. The use of hemlock softwood spindles is such an example.

   The hardwood resource of British Columbia could be examined to assess the potential to replace foreign hardwoods (in shrinking supply) for certain end uses.

6. The **lack of processing ability,** especially drying capability on the coast is impeding the ability to service some markets. In addition, refusal to accept anti-stain treated lumber in various markets is forcing production into dry lumber products. Japanese preference for dry product framing lumber, although largely developed by British Columbia for green hemlock, has forced the use of dry SPF and American dried hemlock because coastal British Columbia cannot supply the dry hemlock. The demand for laminates in Japan and elsewhere require a dry product. The roof truss industry in Europe consumes over 100 million fbm per year of dry 1½ x 4" construction lumber. Hemlock's strength is an advantage, but hemlock is generally shipped in green condition from the province.

In 1983, Coastal British Columbia had the ability to dry 323 mmfbm in the primary facilities and a further 223 mmfbm in the remanufacturing facilities for all species.[1] Hemlock joinery is used in the dry state in almost all uses. Coastal British Columbia must therefore become much more capable of shipping a dried product.

In 1983 species dried were as follows:

14% Hem-bal Dimension
36% Hem-bal Industrial
46% Western Red Cedar
4% Other Species

In 1983 a further estimated 100 million fbm was shipped to the U.S. Pacific Northwest for drying.

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[1] **Kiln Drying Trends on the B.C. Coast** - Council of Forest Industries of B.C. (1983).

Clearly, except for cyclical anomalies, there is insufficient drying capacity to accommodate the existing production. Future increase in specialty products and the expanded marketing of hemlock in dry condition, indicate much greater kiln facilities will be required.

The primary industry's kilns were established to dry commodity dimension, more to reduce its weight to facilitate rail shipment, than to technically dry it. These kilns are often inadequate, or too large to handle special and smaller charges. The new kilns established at the smaller remanufacturing plants have enjoyed the new business growth in this sector.

With equivalent kilns, the costs of drying hemlock lumber are cheaper in British Columbia than in any offshore market. This is a function of relative energy costs, costs of land, interest and storage.

	Cost of Kiln-Drying Lumber of 2" Thickness
United Kingdon	\$ 90 - \$100
Benelux	80 - 85
German	95 - 110
France	90 - 100
Japan	110 - 120
British Columbia	45 - 50

7. Relative product costs and the failure to adequately promote our wood products and production of specialty products is dramatically creating a significant **influx of competitive products** into our wood product market. The following tables demonstrate the extent of competitive products in some of our key wood product markets.

TABLE 15

GERMAN WINDOW MARKET RAW MATERIAL

	1971	1983
Wood	81%	40%
Vinyl	19%	40%
Aluminum		20%

Source: Alumi News

TABLE 16

UNITED KINGDOM DOOR & WINDOW RAW MATERIAL

	1975	1985
Wood	51%	41%
Aluminum	36%	36%
Steel	13%	10%
Vinyl		13%

Source: Alumi News

TABLE 17

UNITED STATES WINDOW RAW MATERIAL

	% of Market 1982	% change since 1974
Aluminum	58	+ 16
Wood	26	- 12
Aluminum clad	1	
Vinyl clad	8	+167
Steel	2	
Vinyl	4	+100

Source: Alumi News

TABLE 18

UNITED STATES FRONT DOOR MARKET RAW MATERIAL

	% of Market 1982	% change since 1974
Wood flush	24	+380
Wood panel	9	- 86
Steel flush	31	+ 19
Steel embossed	33	+450

Source: Alumi News

TABLE 19

UNITED STATES SIDING MARKET RAW MATERIAL

	% of Market 1982	% change since 1974
Hardboard	30	+ 88
Lumber	7	- 13
Brick	21	- 13
Stucco	10	- 20
Aluminum siding	9	+ 31
Vinyl siding	2	+100

Source: Alumi News

The dramatic shifts in market demand particularly with steel, vinyl and aluminum underlines the strong competitive position and threat of substitute materials to lumber.

8. The **market end use of product is changing.** In the United States, the use of wood in remodelling is growing at a faster rate than new housing starts. In 1986, 37 percent of the lumber consumption in the U.S. went into new housing and 28 percent into renovation. In 1977 the respective figures were 46 percent and 19 percent. Generally speaking, the wood used in renovations is in the form of specialty products. It is important to recognize that the use of wood is significantly changing, and possibly in the near future the number of U.S. housing starts will no longer be valid as an industrial indicator of economic activity,

9. A very significant influence on the world lumber trade is the relative **currency values or exchange rates.** With global trade, this single factor has perhaps more effect on world lumber trade than any other and cannot be ignored. However, exchange rates are not controlled by the forest industry or forest trade.

   It is important in world lumber trade to establish a longer term market plan and relationship with the trading partners, and at the same time provide some opportunity for gains provided for by rapid changes in exchange rates. A balanced consistent global market plan for some portion of the lumber production in accompaniment with an uncommitted opportunist allocation will provide for smoothing some of the exchange rate influences.

10. In recent years, countries have relied less on tariffs as a method of excluding or restricting imports. In their place a whole new range of non-tariff measures have come into existence eg. custom user fees, duty remission and drawbacks, import restrictions or quotas, internal discrimination and technical barriers such as standards or specifications. In effect both **tariff and non-tariff barriers** must be considered in trade and export strategy addressed to any particular country.

11. **Transportation and distance** to the market place are significant market influences in our world lumber market trade. Competitive methods of bulk transportation have been derived for handling the commodity products amidst highly variable oil prices. New methods of transportation and distribution are now being used for specialty products that accommodate the customer in providing an undamaged product and service to his needs.

    For local or domestic transportation the cost advantage/disadvantage must be considered. The remanufacturing industry is concentrated in the Lower Mainland where there is a major transportation infrastructure for ships, rail, road, and barges. Other locations in British Columbia are at a comparative cost disadvantage for shipping with the exception of those facilities that can use mass hauling.

12. British Columbia has one of the **best quality softwood fibre resources** remaining in the world for development of specialty product. The significant contribution to the world market supply of softwood lumber exports suggests that British Columbia is in an opportune position of establishing more control of its market place and the pricing of its products.

A number of forest industry market reports and a recent synopsis of the joinery market by Ted Cameron[1] indicate excellent market opportunities for British Columbia products providing that effective marketing is done. **The total joinery consumption,** based on 15 percent of wood useage in Europe, U.S.A., Canada and Japan **is estimated at 32 million m^3 or 13.6 billion fbm. It is interesting to note that this particular figure equates to the total lumber manufactured in all of British Columbia in all grades and species.**

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[1] Ted Cameron was a Senior Vice-President of Seaboard Lumber and is now President of Elk Forest Products.

Very small fluctuations in the world wide raw material supply such as limitations on exports of hardwood logs from Indonesia and change in quality of supply from Sweden can create large incremental demands for British Columbia products. The opportunity to use these world wide forest product market influences to the advantage of British Columbia in development of specialty products appears substantial.

This very shift is occurring. However for lack of suitable substitutes in wood products and/or market promotion, many industries throughout the world have gone to other competitive products such as plastics and metals at often higher cost.

C. OPPORTUNITIES IN SPECIALTY PRODUCT MANUFACTURE

Some opportunities in specialty product manufacture are shown in the following tables. The Council of Forest Industries has studied some of these opportunites in detail and in a world market context. Many other products could be developed.

PRODUCTS AND MARKETS

Product Classification	Product End-use	Species Used	Market Location	Reman Product Description
JOINERY	Wooden Windows	Hemlock Douglas Fir Sitka Spruce Western Red Cedar Yellow Cedar	United Kingdom France Germany Switzerland Benelux Italy Japan Australia U.S.A. Canada	A grade of clear and/or recoverable clear lengths in vertical grain. Kiln Dried: to 12-14 percent moisture content. Thicknesses: 1" (25mm), 1-1'1/4" (32mm), 1-1/2" (38 mm), 2-1/2" (63 mm),2-3/4" (70 mm), 3-1/2" (89 mm) and 4" (100 mm). Lengths: 3' (1 metre) to 16' (5 metres).
	Panel Doors	Hemlock Douglas Fir Western Red Cedar Yellow Cedar	United Kingdom France U.S.A. Canada Other European	Clear and/or recoverable clear in vertical grain. Kiln dried: to 12-14% moisture content. Thicknesses: 1-1/2" (38 mm), 1-5/8" (42 mm) and 2" (50mm). Lengths: 7' for slides and jambs, and 3' for rails.
	Wooden Roller Blinds & Shutters	Hemlock Douglas Fir	France Italy Spain Morocco Algeria Tunisia	A grade of lumber which provides thin cuttings of clear material in short lengths. Kiln dried: to 12-14 percent. Thicknesses: from 1" (25 mm) to 2" (50 mm). Widths: Varied.

Product Classification	Product End-use	Species Used	Market Location	Reman Product Description
JOINERY	Wooden Ladder Rails	Hemlock Douglas Fir Sitka Spruce	United Kingdom France U.S.A. Canada	A highly selected grade of clear vertical grain lumber. Kiln dried: to 12-14 percent. Lengths: Long. Thicknesses: 1-1/4" (32 mm), 1-1/2" (38 mm). Widths: 3" (75 mm), & 4" (100 mm).
	Decorative Panel Blanks	Hemlock Douglas Fir Western Red Cedar	Germany France United Kingdom Italy U.S.A. Canada	A clear, flat or vertical grain. Kiln dried: to 12-14% moisture content. Lengths: Both short and long. Thicknesses: 5/8" (16 mm). Widths: 4" (100 mm) and 6" (150 mm).
	Rolling Garage Doors	Hemlock Douglas Fir Cedar	France U.S.A.	A clear flat or vertical grain lumber. Kiln dried: to 15-16% moisture content. Lengths: Long. Thicknesses: 1-1/2" (38 mm) and 1-5/8" (42 mm). Widths: 3" (75 mm) and 4" (100 mm).

Product Classification	Product End-use	Species Used	Market Location	Reman Product Description
JOINERY	Mouldings Louvers/Cabinets Spindle Blanks Stair Treads Furniture Components Garden Furniture Gates Shelving Shomi Screen Rails (Japanese Doors) Edge Glued Components	Hemlock Douglas Fir Sitka Spruce Western Red Cedar	United Kingdom France Germany Benelux Italy Spain Japan Australia U.S.A. Canada	These cover a range of very small clear sections which can be further utilized by manufacturers who edge glue, fingerjoint and/or profile these into products.

A number of specialized products are required in lumber which are not Clear, but structurally sound.

Product Classification	Product End-use	Species Used	Market Location	Reman Product Description
CONSTRUCTION	Flooring Decking	Hemlock Douglas Fir SPF	United Kingdom Japan U.S.A. Canada	A sound, tight-knotted material. Machining: profiled to flooring patterns as required in each market. Kiln dried: to 12-14% moisture content.
	Sidings	Cedar Hemlock	Benelux France Australia	A sound, tight-knotted (also clear) material. Machining: Board profiled and/or resawn to various patterns, including a bevel.

Product Classification	Product End-use	Species Used	Market Location	Reman Product Description
CONSTRUCTION	Sidings	Cedar Hemlock	U.S.A. Canada	Kiln dried: Sold both kiln dried or unseasoned.
	Machine Stress Graded Lumber	SPF Douglas Fir Hemlock Sitka Spruce	Canada U.S.A. United Kingdom	Dimension lumber that is tested and graded by machine for stress.
	Truss Stock	SPF Hem-Fir Douglas Fir Larch	U.S.A. Canada United Kingdom	High quality structural components. Machine stress graded in some markets.
	Laminating Stock	SPF Hem-Fir	U.S.A. Canada	Dimension lumber of high grade with no wane allowances. Kiln dried: to 12 to 14% moisture content.
	Precision End Trimmed	Douglas Fir Hemlock Sitka Spruce SPF Western Red Cedar	Canada U.S.A. United Kingdom Japan Australia	Framing lumber that is trimmed to a specific length. compression. Fine appearance. Unseasoned, rough or surfaced.

Product Classification	Product End-use	Species Used	Market Location	Reman Product Description
CONSTRUCTION	Specialty House Components	Douglas Fir Hemlock SPF	Japan	A number of smaller and shorter lengths in construction qualities now made in Japan to service the prefabricated house industry.
	Core Stock	Douglas Fir Hemlock SPF.	Japan	Common lumber that is faced with veneer or slicing material for exposed faces
	Pressure Treated Lumber	Pine Fir Douglas Fir Hemlock	Canada U.S.A. Pacific Rim	Framing lumber and other special products that are pressure treated to provide longer life.
	Beams, Stringers Exposed Posts	Douglas Fir Hemlock Sitka Spruce Western Red Cedar	Canada U.S.A. United Kingdom Australia	Higher quality material in larger dimensions. Graded for high loadings in bending or compression. Fine appearance. Unseasoned, rough or surfaced.
	Railway Ties Mine timbers Formworks	Douglas Fir Hemlock SPF	Canada U.S.A.	Timbers of various grades and sizes for special end-uses.
	Mattress and Bedframe Components	SPF	Japan U.S.A.	Very small sections of construction grade material. Kiln dried: to 12-14% moisture content.

Product Classification	Product End-use	Species Used	Market Location	Reman Product Description
LOW GRADE (UTILITY & ECONOMY)	Case and Pallet Stock	Hemlock Douglas Fir SPF	United Kingdom Benelux Japan U.S.A.	Low grade boards - 7/8"x4" and 1"x4". Short framing - 2"x4" and 3"x4".
	Finger Jointed Framing Lumber	SPF Douglas Fir Hemlock	Canada U.S.A.	Framing lumber of lower grades that are chopped and finger-jointed to provide a more stable piece of framing lumber.

A short discussion of the available provincial species and grades is warranted to outline the vast array of market opportunities the forest industry of British Columbia has in meeting the needs of customers throughout the world.

I. Species Market Opportunities

a) Cedar

Traditionally, remanufacturing plants have utilized cedar as a preferred species to get started because:

- Cedar has a large green market.
- Cedar has a low value for low grades.
- The opportunity to add value to coastal cedar lumber production is great.

As a result, the remanufacturing of cedar has flourished to the extent that the remanufacturing production capability is now well developed for the given raw material supply. As a result, the raw material prices are being driven upwards and profit margins of the cedar remanufacturing industry are being narrowed. Opportunities, however, still exist in producing more specialized, higher valued products.

b) Hemlock

Growth trends for remanufacturing hemlock lumber are much larger than for cedar. The remanufacturing of hemlock, the largest volume coastal species, it still in its infancy.

However, as noted, the market for hemlock generally requires drying before processing, with a substantial capital cost.

c) Douglas fir

Growth trends for remanufacturing Douglas Fir lumber are significant, especially into uses of strength quality applications such as flooring, joinery, etc. Historic uses of Douglas fir as a specialty product can be repeated.

d) Spruce, yellow cedar, pine

Remanufacturing of Sitka spruce, yellow cedar, and pine on the coast is relatively untouched. Markets and specialty product development for these species remain to be further developed.

e) Spruce-pine-fir (SPF)

Although SPF is generally considered a commodity grade, significant opportunities exist to develop 'specialty' products from this resource. Market and product development of the interior species group, (by far the largest volume in British Columbia, particularly in lodgepole pine) is just in its infancy.

2. Lumber Grades and Application

a) No. 3 Common/Utility

This is the lowest useful grade. In most cases, the pieces are downgraded in primary sawing because of defects which render the piece structurally unsound or because of defects in some part of the piece which are unsightly. When remanufactured to smaller sizes, this grade provides higher value material than the original piece.

b) Number 2 and Better Merch

No. 2 & better merch is structurally sound wood for stress bearing components and constitutes the major production of the primary sawmilling sector. However, when No. 2 & better merch is resawn, there is usually no upgrading and often downgrading occurs. Thus, generally this would be a more restrictive raw material source, though by selective purchasing, it can be economically viable.

c) Shop Grades

Shop grades are clear recovery grades and are graded Select, No. 1, 2 and 3 shop. While there is a #3 shop category, very few mills are generating it and normally shop starts at #2.

Number 2 Shop

This grade is seldom sold on its own, but is included in a grade mix of #2 shop and better.

d) factory select/factory flitch

This is a higher grade of shop and consequently yields a greater percentage of clear cuttings from a piece.

e) Number 2 clear and better

This is very high quality lumber which most customers can utilize as shipped and/or manufacture items directly from the piece. In most cases, these grades cannot afford remanufacturing in B.C. as the return is much higher for the products in the solid form.

Detailed descriptions of species and specifications of lumber grades are set out in Appendices 8 and 9 respectively.

D. GAINING MARKET ENTRY

Emphasis has been given to the need for market enterpreneurship which means more focus on market creation and less on market share. It also implies educating the market, creating the infrastructure and seeking out new applications and uses.

There are a number of factors that will act to effect the rate of market penetration of specialty wood products in export markets and the degree of end use acceptance. These are:

* The perceived comparative advantage of the product relative to the best available alternative.

  - The greater the perceived advantage e.g., higher profitability, ease of operation, appearance, saving in time and effort, the more quickly the product will be adopted by innovators willing to try new ideas at some risk. Other potential buyers will likely wait for evidence that the product worked for someone else.

* The perceived risk or subjective estimate by a prospective buyer of the probability of a negative outcome i.e. uneven quality, lack of product standardization, risk of supply interruption. Attitudes which attempt to impose major changes to customer manufacturing facilities will slow acceptance even when all other factors are supportive.

* The availability of information and availability of product. Not only must the product be readily available but the potential buyer must be aware of the product and informed of the benefits. Products that lend themselves to trial applications or demonstrations will be accepted more quickly.

Uncertainty with respect to the underlying forces in the market will remain a risk issue with British Columbia producers. It is likely that early entrants with new product applications or in dealing with new, markets will encounter risk of various kinds which may involve uncertain customer acceptance, product quality differences, competitive reaction, changes in government regulations and policies, and changes in currency exchange rates.

New and unfamiliar products frequently result in tentative buying behaviour patterns marked by experimental purchases, pilot tests and evaluation. Usage may be confined to a few innovators who may not share their experience. There is usually a lack of information with little comparative data as there may be a lack of standards or specifications. This early stage can be replaced with a product adoption period marked by growing awareness, intermittent but increasing stages of interest and evaluation and, finally product trials leading to adoption on a full and continuing basis. It should be repeated that the early users are usually innovators as other potential buyers are usually more risk-adverse and wait for evidence that the product has worked for someone else.

To summarize, as the market expands, there will be new opportunities for the augumentation and product adoption or service improvement to better fit the needs of customer groups. In this sense, market growth creates its own momentum - growth induces growth.

E. MARKETING NEEDS

As the production of specialty products is to be market driven, a much better understanding of marketing and the factors that influence markets must be had by the industry. The production of specialty products requires a much closer inter-relation between the customer and the producer. The customer requires a very specific and unique grade and quality of product in quantities to match his needs. Few specialty products are sold by general grading rules.

Specialty products also demand superior service. The customer depends and relies on his purchase for quality and timely delivery of his product to minimize needs of carrying inventory. This quality product and service offsets any cheap price another product might be seen to have. Very often the quality and service mean more to the customer than the unit price he must pay.

In the marketing of specialty products it is not uncommon for both the producers and the customer to visit each others' plant to monitor the production and the use of the products. Many times there are upfront costs of market development without any sale of wood taking place in any major volume being transferred between the two parties. This interchange within the two parties is fundamental in the marketing of specialty products.

Selling specialty products is generally in much smaller quantities and with direct customer - producer relationships than commodity products. This requires a fair amount of upfront expense to develop the individual sale. However, once the initial sale is made the margins in the product sales can continue to be very lucrative and long-standing providing the producer remains committed to quality and service. Clearly some concern must be shown for the entrepreneur who must capitalize on and develop his individualness in the market or market niche while at the same time being able to maximize quality and service for his clientele.

In the marketing of our specialty products there exists a number of marketing needs that must be addressed.

1. There exists the need for basic **market research** in individual countries to better understand the use of wood supply, raw material, nature of the manufacturing facilities within the country, etc. This type of analysis is considered a very broad brush of market research that looks at opportunities for the use of our wood from a broad perspective.

2. There is a need for **market promotion,** promotion of products, species and the use of wood in potential market places. The Council of Forest Industries of British Columbia has been very effective promoting the use of Hemlock joinery products in some areas of the world. They are to be commended for their efforts. However, much more promotion of specialty wood products needs to be done.

3. There is a need for **product research** that may apply to a particular species for specific end-use and/or product in the market place. Although this product research is generally done on a trial and error basis between the customer and producer, some opportunity exists to generalize product descriptions and uses of wood within the various countries of the world. In numerous cases, minor adjustments, on basic technological application of our wood products will satisfy some of the negative conflict in arguments in use of products. In other cases product research is required to improve specifically the application of our wood product in the market place. For example the roller blind industry in Italy requires a finish that will protect it from ultra violet rays of the sun.

   More work is required in the promotion of our products and their proper application in the market place. For example, locally, cedar siding and panelling products are often improperly applied creating an eyesore and an expensive renovation job. A simple pamphlet on the proper installation would provide the end user with some simple instructions and dissuade him from going to vinyl or some other competitive products.

4. **Standards research** and its promotion and development is required for many products whether it be in finishing, structural strength, drying, dressing, etc. There exists a need to develop and compare standards either for codes, defined by government regulations, or simply, for industrial applications, to have a better knowledge of our own species in the workability of the market place.

5. Another major step in marketing is the actual sale, or **commercial negotiation,** of products between a customer and a producer. Specialty product manufacturers suggest this negotiation usually takes place only after interchange of communication directly between the producer and the end user of the product. This negotiation requires creativity and responsiveness on behalf of the producer to satisfy the customers demand.

The marketing of specialty products requires that the producer recognize an entirely different approach in the marketing of his product to the end user. The producer must be committed to quality production and be able to service the client's needs on his terms. The producer must be able to provide direct client interplay and responsiveness to the client quickly. Sometimes the more lucrative specialty product manufacture is found in the marketing or sale or contract negotiation between the final product end user and the producer plant. The industry must recognize the changes that are required in marketing functions of specialty manufacture to be able to provide long term industrial growth in this solid wood industry. These special services are of great importance to the end user and will warrant substantial incremental charges.

Situation Assessment

VII SITUATION ASSESSMENT

This section of the report deals with an analysis and assessment of specialty wood products in terms of key factors such as timber supply, manufacture, markets, technology and capabilities. The outcome is a series of statements based on facts and/ or generally supportable beliefs concerning present industry strengths and limitations, including identifiable external long term opportunities and threats which effect further economic development.

The assessment is structured as follows.

- Government policy programs and industry infrastructure.
- Timber inventory and supply.
- Lumber manufacture, primary process.
- Specialty product manufacture.
- Products and markets.
- Technology, research and development.
- Marketing, sales and distribution.

The statements provide a basis for critical assessment of the adequacy of industry approaches and practices and the central issues which must be addressed in strategy formulation.

A. GOVERNMENT POLICY, PROGRAMS AND INFRASTRUCTURE

Public sector policy has an important role and impact on the industry. In particular, the provincial government is the effective 'landlord' of the timber resource in the province. As such, its policies directly effect timber availability, cost and tenure holding responsibilities. In terms of development of the special products industry, such forest policy impacts directly on the cost of the raw material to the manufacturers and hence on the economics of further lumber processing for added value.

Strengths

Provincial and federal governments have each given a high priority to the development of remanufacturing, to obtaining higher values from the wood resource, and to the further manufacturing development of specialty products within the forest industry. (The Ministry of Economic Development has assigned an "A" priority to value added wood products - an assignment of maximum effort within the Ministry to this sector.)

- These priorities can act positively, as regards:
    - Governments working cooperatively with wood products producers and exporters in North American and offshore development of markets, product knowledge, and end-user producer relationships.
    - Participation of governments in shared funding programs similiar to the Co-operative Overseas Market Development Program (COMDP) and other initiatives applied to technical and product research and development industry seminars, workshops, etc. Shared government/industry programs have proved successful in promoting product opportunities.
    - Efforts aimed at reducing non-tariff barriers to market penetration.

- Government programs exist to encourage export development, small business/entrepreneurship and product diversification through assistance related to capitalization, operating costs, management training etc. Examples of such programs are:

  - Resource industries valued added program.
  - Resource industries modernization program.
  - Low interest funding and loan guarantees through the Small Business Development Fund.
  - Export credit loans.
  - Venture capital program.

  A listing of current federal and provincial programs relevant to the development of the remanufacturing industry is included within the appendices of the report.

- The Ministry of Economic Development is actively examining the establishment of an Export Strategy Advisory Board and an Export Strategy Centre. The Ministry is also assessing the value of 'trading house concepts' applied to marketing of added value products.

- Government facilities are 'in place' to provide a focus for market, end-user and producer knowledge.

  - B.C. Enterprise Centre - exhibition facilites.
  - Computer communication network.
  - Facilities and representation in foreign markets through embassies, commercial attaches, etc. to act as a support group for trade and promotion initiatives.

- Government, as the landlord of the fibre resource, is encouraging tenure holders to extract greater value from the timber resource.

- Recent provincial policy initiatives[1] announced by the Ministry of Forests and Lands are intended to support the development of the secondary manufacturing industry and specialty wood product manufacture. These initiatives include the following elements:
  - organization of a five year agreement/industry program to expand contacts, identify potential product/markets, etc.
  - institution of increased 'fees in lieu of manufacturing' directed to log exports to encourage job creation in B.C.
  - tenure policy and competitive sales are to encourage manufacturing potential more explicitly.
  - application for new Tree Farm Licences and timber allocation may favour or certainly recognize secondary manufacturing proposals.
  - funding levels will be increased for product and technology research to agencies such as FORINTEK through matching grant programs.
- The forest industry has an effective infrastructure of associations/agencies which act to provide membership advocacy; product and market promotion, technical research and statistical information services e.g., COFI, ILMA, NILS, CLMA, FORINTEK, FERIC, etc.
- Federal-provincial cost sharing agreements presently exist for industrial development initiatives within the 10 year Canada/British Columbia Economic and Regional Development Agreement (ERDA).
- Replacement of the softwood lumber export charge by the revised timber pricing stumpage charges has removed the bias against higher valued products inherent in the export charge.

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[1] Pp. 4 and 5 of September 15, 1987 Press Release. Ministry of Forests and Lands.

Limitations

- The private sector has mixed or defensive views on the role and place of government assistance particularly as this is directed to programs involving subsidies or grants. There is a fear of discriminatory or 'uneven' assistance to competition. This does not apply to broad promotion incentives or general industry assistance where such efforts are usually welcomed.
- There may be a danger of overlap or duplication between inter and intra government levels and associations in industrial development initiatives.
- Relatively few companies have applied for government assistance programs. There is a certain degree of skepticism as to the 'net worth' or applicability of such assistance coupled with little awareness of available programs.
- The provision of added fibre to the Small Business Enterprise Program (SBEP) or to individual logging companies, by itself, does not materially effect the case 'for or against' specialty products manufacture, especially for the independent specialty products manufacturer who generally has limited or no interest in logging or primary log breakdown or 'backward integration'. It should be noted, however, that timber sale procedures are being amended to encourage manufacture of higher valued products.[1]
- The softwood lumber export charge followed by replacement through a revised timber pricing policy in B.C. has added significant cost to the delivered log in the form of increased stumpage. The effects of the new stumpage pricing structure has a direct flow through to raw material costs of the special product manufacturer. Increased stumpage costs may make it difficult for some primary sawmills to survive during adverse periods of the cyclic market. Others may only survive by obtaining higher value grades from the log. This is

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[1] Forest Amendment Act, 1988, Section 7

particularly the case in the Interior. In this sense, the imposition of higher stumpage will act as a strong 'motivator' to achieve higher value.

In effect, the increases have been presented, through government submissions on the 'Memorandum of Understanding' on softwood lumber[1], as follows:

TABLE 20

IMPACT OF TIMBER PRICING CHANGES
$\$/M^3$

	1985/86	New Pricing	Increase
Coast	$\$4.41/m^3$	$\$10.59/m^3$	$\$6.18/m^3$
Interior	1.31	8.59	7.28
B.C. Avg.	2.18	9.19	7.01

In terms of the impact on lumber manufacture, recent studies[2] have indicated that the increases in stumpage fees and forest renewal costs on lumber manufacture are significant.

* Canada's federal sales tax system is the only one in the world that favours imports over domestically produced goods. It is also one of a very few countries that effectively levies sales tax on exports through imposition of tax on manufacturing 'inputs'. (The system is now under review within forthcoming overall federal tax changes.)

[1]
[2]

Province of British Columbia - Forest Policy Changes - November 1987
Widman Management.

B. TIMBER INVENTORY AND SUPPLY

Strengths

* Coastal B.C. has one of the best quality stands of softwood timber in the world. The old growth timber supply favours higher value products. As world wide supplies of high grade and high value fibre are reduced, demand and prices for this coastal wood will increase providing a long term opportunity for specialized product markets.

* The coastal resource has a sustained supply of old growth timber for at least 20 to 40 years. Negative trends of declining species i.e. Douglas-fir cut are now approaching stability. To the year 2000, there will be a gradual increase of second growth stands at which time, this harvest will gradually accelerate. Graphs of the coast harvest by species are shown overleaf as Figures 8 and 9.

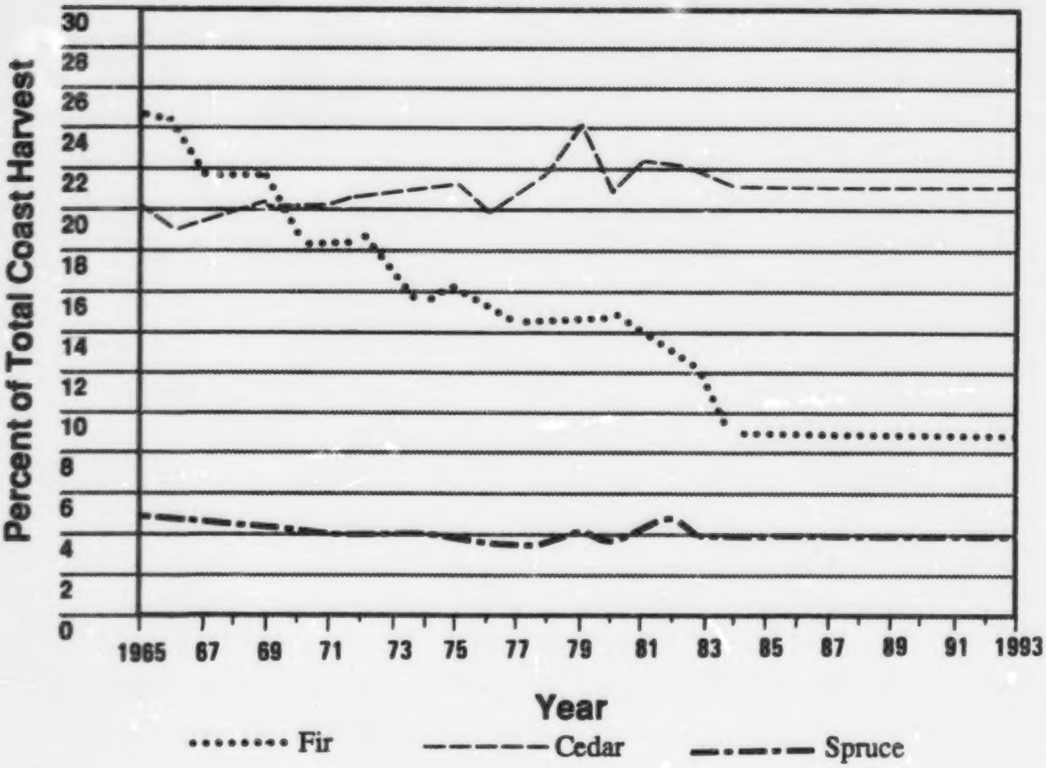
* There is a high degree of industry concentration in tenure holding, i.e. in 1984 over 5,800 stumpage timber marks were held by 2,425 licencees. Of these, 13 percent accounted for 81 percent of crown scale value and over 80 percent of crown timber volume harvested. While it is recognized that such concentration may have certain negative features this concentration is classified in this report as a relative strength in terms of the ability to achieve a coordinated direction to added value strategy. The listing of scale volume and value is shown as Table 21.

* Substantial profit opportunities exist in coastal British Columbia for log sorting and merchandizing for market product. The few custom log cutting operations that exist have realized some of this profit opportunity.

Figure 8

Coast Harvest by Species

(Species with decreasing/stable share)



Source: C.O.F.I. and Ministry of Forests

Figure 9

Coast Harvest by Species

(Species with increasing share)

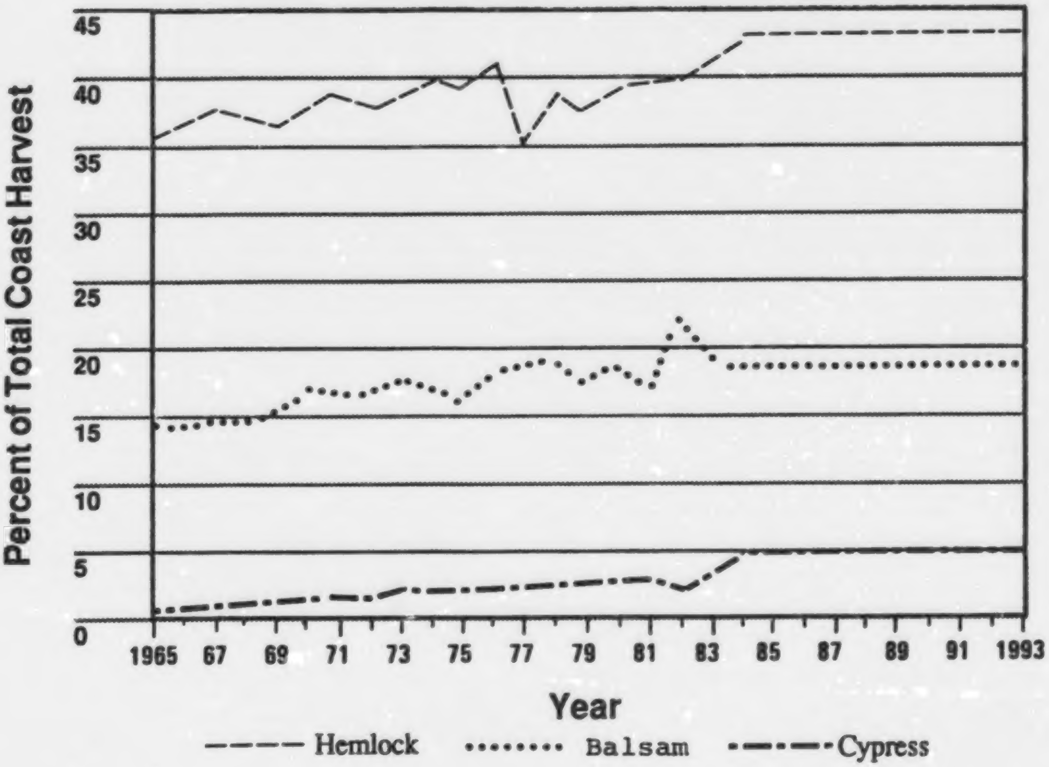


TABLE 21

SUMMARY OF CROWN SCALE VALUE AND VOLUME (1984)

	VALUE		VOLUME	
	$ (000)	%	m^3 (000)	%
20 Licencees	84,639	58.1	38,407	61.5
108 Licencees	33,595	23.2	11,654	18.7
	118,234	81.3	50,061	80.2

Limitations

- Notwithstanding the positive assessment of the present timber inventory; wood availability, quality and cost are limiting factors to overall long term industry growth.

- The coastal industry, in particular, faces declining log grades, smaller timber and increased harvesting costs due to:

    - reducing proportions of first growth stands.
    - steeper slopes, longer haul distances.

  A graph of coastal logging costs is attached overleaf as Figure 10.

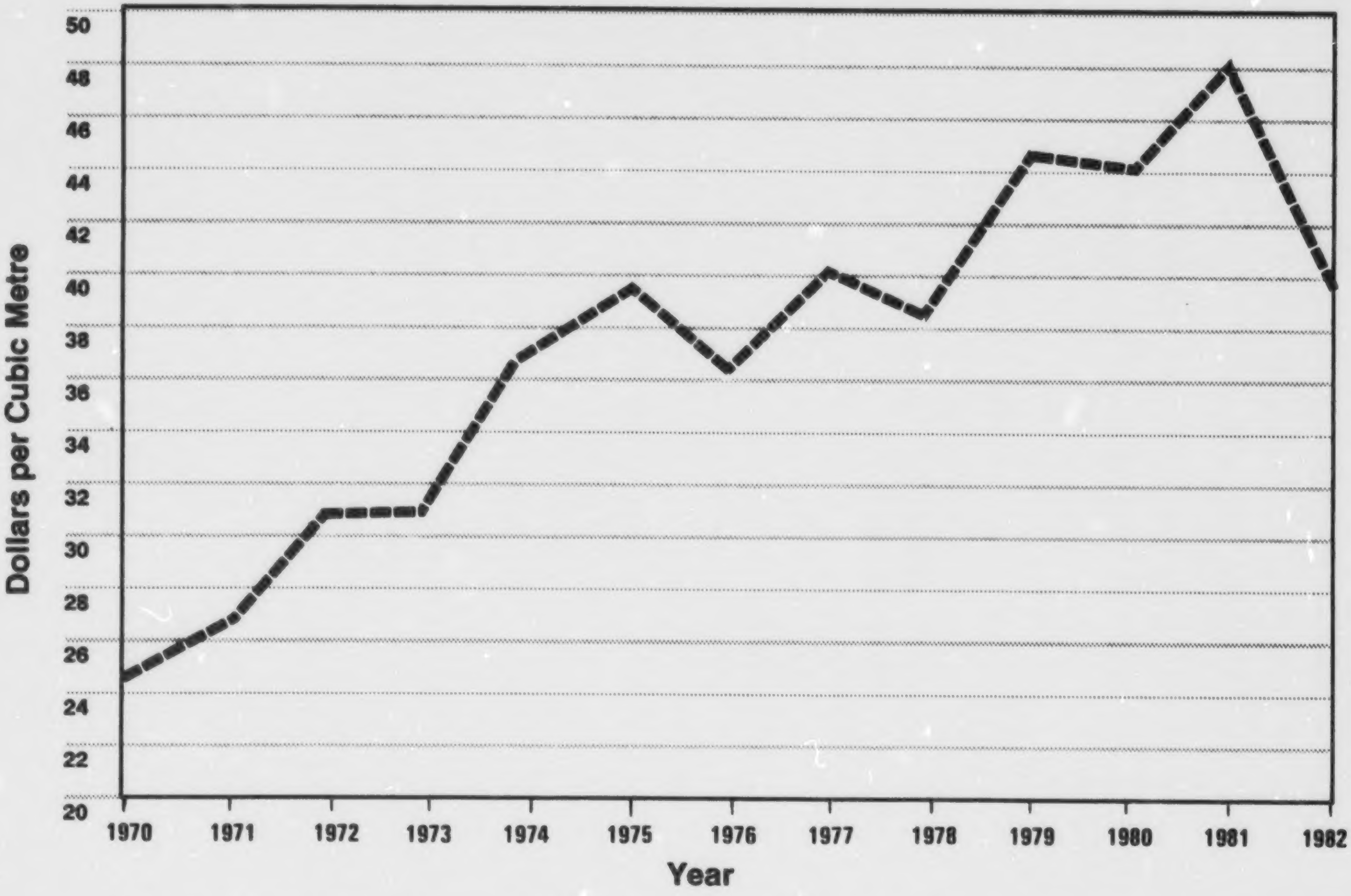
- Basic forestry research funding is insufficient when the priorities of pest management, vegetation management and prescribed fire are addressed.

- There is a future shortage of sawlog supply in the Interior and a deficit in the knowledge base required to solve the shortfall problem through forest renewal and incremental upgrading. The severity of the knowledge base deficit in the Interior is a result of historical and geographic factors. Throughout most of the Interior, large scale forest harvesting commenced at a much later date than in the coastal region. Forestry research in the Interior has paralleled this lag.

Figure 10

Coast Logging Cost(1), 1982 Dollars

(constant 1982 dollars per cubic metre)



(1) Includes salaries and wages, materials, fuel and electricity less purchase wood and stumpage and royalty. Does not include depreciation, interest, etc.

- While opportunities exist and are being developed in improving policies and practices of log supply, increased supplies of commodity products from cheaper supply areas are making the production of commodity items in coastal British Columbia non-competitive. In fact, the cost of producing a commodity dimension product is resulting in coastal B.C. being non-competitive with the best of its plants when shipped to markets served by the U.S. southeast. This will continue to force the coastal forest industry to utilize its log supply in a better way.

- As stated previously, log costs are being further increased by higher stumpage prices and a reallocation of forestry responsibities from the public to the private sector.

- As stated previously, timber losses due to pest damage indicate profligacy with mortality rates exceeding 40 percent of the annual harvest.

C. LUMBER MANUFACTURE - PRIMARY PROCESS

Strengths

* The coastal forest industry has typically produced in the order of 15-18 percent shop and better grade of primary sawn products. Recently, added emphasis on grade cutting by some operations has yielded in excess of 30 percent of shop and better grades (in cutting hem-bal). It is estimated that the coastal forest industry with improved primary cutting practices can greatly improve the percentage recovery of shop and better grades of primary sawn products (in hemlock the upper grades can be doubled), and thus greatly improve the value recovery from the log.

* As illustrated in the analyses by species, within the Business Case section of the report, similiar grade recovery improvement potential can be realized in Interior operations.

* The primary mills are generally
  - efficient.
  - high production, low cost processors.
  - flexible on the coast and somewhat less flexible in the interior.
  - recovery effective (increasing capability).
  - some state-of-the-art technology is being applied.

* Large capital expeditures are not required to increase mill flexibility related to product recovery or to enable the mill to improve product value.

* There is a high degree of industry concentration with the largest 20 producers accounting for approximately 80 percent of the total lumber produced in the province. As discussed under timber supply this is assessed as an overall strength in terms of ability to implement a value strategy. Table 22 lists production by companies.

TABLE 22

SOFTWOOD LUMBER PRODUCTION (1986)

		MM fbm
1.	West Fraser	1,087
2.	CFP	1,047
3.	BCFP	961
4.	Weldwood	868
5.	MB	830
6.	Westar	640
7.	International	600
8.	Balfour	528
9.	Doman	527
10.	Northwood	460
11.	Tolko	443
12.	Crown	350
13.	Slocan	344
14.	Crestbrook	283
15.	Evans	260
16.	Finlay	252
17.	CIP	249
18.	Rustad	220
19.	Carrier	202
20.	Ainsworth	190
TOTAL PRODUCTION		10,341

= 79.5 percent total lumber production volume of 13.3 MMfbm

The extent of this concentration both in timber tenure and primary lumber processing emphasizes the major role that these companies will likely play in the future development of the special products industry as they increasingly adopt a value approach.

In summary, the high quality of wood fibre, the realization of tremendous primary and secondary marketing opportunities, and the utilization of technology will favour the primary sawmill industry in overcoming its high costs, and permit broader product marketing opportunities.

Limitations

* Present production "orientation", management organizational structure, capital investment and mill configurations emphasize

- high volume - mass production
- low cost - low labour content.

This particularly applies to the Interior with non-grade cutting mills geared to smaller diameter, mixed species, (SPF) and lower grade fibre.

* The industry believes that it is difficult to mix value and volume production strategies within a given mill process. (This may not be as difficult to change as currently perceived).

* At present, coast mills are generally limited in

- sorting ability
- grading facilities.
- drying facilities

* Traditionally the coastal primary forest industry has been a green cargo market for ocean shipping that has not been weight sensitive. As a result, and as previously discussed, the kiln capacity for both primary and remanufactured products on

the coast is very limited. The trend, because of the demand for dried products and concern for anti-stain chemicals, is for the coastal mills to develop additional drying capacity. The market in some cases is giving preferential treatment to dry products and in fact denying green, chemically treated products.

- Hemlock particularly, is known for its kiln drying difficulties where uniform drying and elimination of wet pockets is an important millwork consideration. All species have their idiosyncrasies.

- The sawmill or primary producer is generally limited to the number of sorts that can be made. Extra sorting is required for separation of species and/or higher valued specialty products.

- Most of the lumber sizes developed from primary cutting programs are not compatible with specialty product programs. eg. 7/4" results in significant fibre loss when converting to 5/4" specialty products.

- At present, there is limited segregation of species of logs in the Interior. Sorting is necessary for specialty product manufacture, eg. lodgepole pine.

- The coastal forest industry, although proclaimed to be a grade cutting industry, still produces approximately 50-60 percent of its primary sawn product in the commodity or dimension product. A substantial part of the coastal primary industry has not yet recognized that it cannot produce this product to that degree and remain competitive or profitable in the long-term. It should be stated, however, that a select few of the major forest companies have recognized this fact and are making significant marketing changes.

- In general, the 'added value' potential provided by further special products manufacture has not been viewed by the industry as being sufficient to warrant the costs, effort and reorganization involved, e.g.

  - production flow/volume interruption;
  - added labour cost;
  - the reconfiguration required for marketing, sales and distribution of specialty products.

  Until recently, management has not recognized or understood the 'scope of opportunity' for such investment.

D. SPECIALTY PRODUCT MANUFACTURE

Strengths

* There is significant added revenue and profit potential in specialty products manufacture and marketing. (This is demonstrated in the "Business Case" section of the report).

* There is an increasing recognition of the profit potential in specialty products manufacture with recent growth in such processing by primary producers (including the use of 'custom' cutting) and by independent mill operators.

* The western red cedar specialty products sector has evolved as a strong, mature industry.

* Processing facilities for specialty products must recognize the need for:

- specialization
- flexibility
- small volume manufacture
- accommodation of high labour content operations

and an entrepreneurial management approach which requires:

- attention to material management including fibre utilization and a close 'hands on' control of the mill run.
- entrepreneurial initiatives directed to changing products
- cost control
- close attention to quality.
- sensitivity to customer requirements and to change in the market place.
- closer 'positioning' to end users.

These requirements favour a separate processing facility from the primary mill and, in some cases, a separation from the management organization of the primary lumber manufacturers. As a result, the small entrepreneur has emerged to play an important role in the forest industry, acting as a 'custom cutter' for the primary producer or as an independent proprietor buying and processing lumber for his own markets.

- There is much more fibre availble for higher valued products both on the Coast and in the Interior.
- There is substantial waste in remanufacturing. The cost of freighting a product with a relatively high waste factor, in addition to the cost of waste disposal, has been a deterrent to shipping lower grade material offshore. These have emerged as positive factors for specialty product manufacture.
- Great opportunities for remanufacturing in British Columbia are apparent. A large proportion of the upper grade primary sawn material is being exported green in unfinished or unprocessed form. Demand for more finished products has evolved amidst changing world-wide conditions of higher transportation costs, labour costs and environmental concerns. As a result, remanufacturing of primary lumber products in British Columbia to more finished products has just started.

Limitations

- Manufacturing capacity to add value to the products of primary industry has not yet been fully developed in British Columbia and is largely due to unrecognized opportunity. A large proportion of the secondary manufacturing that has been developed in North America has been in the Pacific Northwest of the United States, (ie. Washington, Oregon and Idaho).

- The precision of manufacture and the level of quality demanded by end users for specialty products is much more of a factor than for commodity lumber. This has been viewed as a deterrent by primary producers when considering entry into production of higher value products.

- Present re-manufacturing capacity is underutilized for processing hem-fir (including drying) and limited for SPF. If anticipated improvements are made in primary cutting to increase shop and better yield and decisions are made to proceed further into specialty manufacturing, this capacity will be extremely inadequate.

- The concept of a mixed species grouping has proved ideal in the production of commodity construction lumber, but is a major constraint for almost any program that involves the production of lumber for specific higher paying end-uses. For virtually every higher value potential market the segregation of the species is essential. Present logging and sawmilling practices have not yet recognized this need.

- It is difficult to obtain financing for the small independent owner/manager for major capital investment and expansion, market promotion and research, technical innovation, and marketing particularly in international areas.

- The independent is dependent on the primary processor for material supply in lumber form.

- There is an element of distrust between the primary processor and the independent remanufacturer in those cases where material supply is an operating necessity to the independent.

- There is a degree of instability in the independent sector which has negative implications for long-term supply relationships with end users, and with fibre suppliers.

- The special products manufacturer is restricted to the sizes and specifications made available to him by the sawmill. These often develop from sawmill programs that are designed to meet the demands of the North American housing market or offshore markets.

- The Owner/operator
  - is normally small, frequently unskilled in planning, and financial management.
  - lacks training programs and may lack grading expertise, etc.
  - is usually production or market oriented, but rarely both.
  - is subject to price swings and volatility of world markets.
  - is usually dependent on wholesalers or an external distribution chain, or a non-affiliated sales agency.
  - may be isolated or 'filtered' from the end-user, end-user markets and needs.

- often lacks overall knowledge of market potential.
- has no protection of proprietary products and markets.
- tends to be isolated, go-it-alone and chauvinistic.

* Most joinery applications require lengths under 10 ft. with the majority of other end-uses in lengths of the 2 to 7 ft. range. On the Coast, sawmills do not traditionally extract these lengths in production nor do they selectively cut back longer length merch material containing these short clear cuttings.

* Fibre costs for special product manufacture are in the 60-70 percent range of total production costs. The independent often cannot afford lumber purchased from primary mills if he is operating as a 'scavenger' or in the lower value product range. Also, the independent is often unable to obtain a long term fibre commitment at long term quoted prices, which constrain his ability to market effectively and to obtain financing. These implications contribute to problems in relationships that occur between primary mills and the independent.

E. PRODUCTS AND MARKETS

Detailed comments on general product opportunities, market influences and marketing trends have been set out in the preceding section. A summarized discussion or 'overview' is therefore presented in this assessment.

Strengths

* The house building industry remains the largest consumer of B.C. wood products. U.S. and Canadian housing starts have shown a significant recovery from the recession period of the early 80's. While starts are expected to decrease in 1988, the degree of decrease will be modest and will be offset by market structural changes favouring the home improvement market which relates to specialty wood products.

Coast

* Douglas fir, western red cedar and hemlock comprise the main coastal species for special product manufacture. Douglas fir and hemlock are the main species for further development, particularly hemlock given its increasing proportion of the coastal forest inventory.

* Hemlock is receiving increased market acceptance, both in North America and offshore - in the latter region, largely due to the market promotion of the COMDP program. Hemlock

can provide a high quality substitute for millwork and joinery items where some hardwoods and other softwoods are presently being utilized but are becoming increasingly more costly.

* Product and market opportunities exist for upper grade coastal species as follows:

- windows
- panel doors
- wooden roller blinds and shutters
- wooden ladder rails
- decorative panel blanks
- rolling garage doors
- etc.

This brief list may not appear impressive but reference to statistics elsewhere in this report shows that lumber consumed in just a few countries, in joinery products alone, more than equals the total lumber production of all species in all of British Columbia.

* There is also a range of small clear sections edge-glued or finger-jointed and profiled for joinery applications:

- mouldings
- spindle blanks
- stair treads
- shelving, etc.

- A number of specialized products are required for lumber which, while not clear, are structurally sound:
  - flooring
  - decking
  - siding
  - specialty house components, etc.

Interior

- Lodgepole pine is a main opportunity species for special product manufacture. There was a total of 18.6 million m3 of lodgepole pine harvested in 1986. At a lumber recovery factor of 200 fbm/m3, this represents over 3 billion board feet. Clearly the great majority of this must continue to be sawn for, and sold as, construction lumber. At present, however, the proportion that is recovered and sold for industrial uses that command a higher value, such as joinery applications, is less than 1 percent. While the volume of clear and shop is relatively limited, a significant proportion of this lodgepole pine resource could be sawn into products that would be suitable for higher value uses. It is from the lodgepole pine log that can develop sound tight knot material that the greatest potential lies.

- It is known that redwood (pine) joinery grades from Scandinavia enjoy premium prices in Europe and the redwood joinery resource is declining as a share of total resource availability. During the past decade, particularly at times of cyclical downturns, there have been trial shipments of lodgepole pine from B.C. to determine whether this would offer a suitable substitute. Despite comments that it is 'whiter', doesn't machine as well and has too many bark ringed knots, it has been generally agreed that a properly graded and manufactured product would have a place in the market.

* Although lodgepole pine is acceptable for furniture and joinery work, there is also a very significant market for shop and better western white spruce which could be extracted from much of the larger old growth spruce. This is a whiter wood than hemlock and because of the closeness in character to European whitewood, it quite probably would be a more desirable component than hemlock for window manufacturers in both Germany and Switzerland. This material is worth 2 to 3 times the value that mills would normally expect from dimension lumber.

* Some of the major opportunities for special product manufacture in the Interior of B.C. depend upon the ability to segregate the species. There are already a few sawmills that are separating lodgepole pine and it is these mills that have been able to develop programmes to supply some of potential industrial end-users of that species.

Limitations

* The markets are generally large with diverse specific uses. The volume for any one item is usually small particularly in comparison to commodity lumber. The entrepreneurial requirement and approach is essential. Specialty products are therefore viewed as a 'not for us' business on the part of many primary lumber manufacturers.

* The volumes of sitka spruce and yellow cedar are small. These species are, however, highly valued in offshore markets. The prices that can be obtained for logs or lumber in primary form have been such that most mills have not found it economic to remanufacture these species into even higher value products. There has also been considerable resistance from buyers in

Japan, whose operations depend on the raw material obtained from B.C. Though opportunities certainly exist for the secondary manufacture in B.C. of sitka spruce and yellow cedar, the total potential volume is much more limited than for the main species.

* There is a level of cynicism, particularly on the part of the European user, about the long-term commitment of the British Columbia supplier regarding supply, quality, and the ability to meet customer end-use needs.

F. RESEARCH & DEVELOPMENT

Strengths

Industry Use of Technology for Specialty Products

* Industry is a major user of technology and is improving its level of technology implementation.

* There are several solid wood product research facilities for product standards and technology research.

* State-of-the-art technology is available to the industry and is being implemented within the industry.

* Technology transfer and communications channels exist, e.g. Wood Forum, professional associations, suppliers.

* The requirements for sophisticated, high-tech know-how are relatively low.

* The Ministry of Forests and Lands is currently developing a program to encourage product research and development.

* Research and development needs in technological, market, product and product application are known, can be prioritized and implemented. Indicated priorities are:

Technological Research Priority Needs

- Drying of Hemlock more efficiently
- Drying of Lodgepole Pine more efficiently to Industrial Dry
- Optional cutting programs of the primary producer for different market cuttings
- Sorting capability and automatic sorting and stacking

- Machine automation for component and other process applications
- Optimizer cutoff saws
- Grade readers
- Saw technology to reduce kerf
- Moulding operations - developing skill levels
- Adhesives technology
- Anti-stain treatment
- Pressure treatment applications
- Application of synthetic or wood patching
- Yield tables of different grades into different specialty products
- Computerized inventory and production planning control systems
- Ability of wood products to exposure to weather
- Ability of various wood products to accept stain/paints
- Protective paints/stains for different applications throughout the world
- Surface hardening of wood products

Market Research Needs

Much more detailed information is needed on the scope of markets by country/region, eg;

- Per capita wood use, demographics and the use of wood.
- Potential markets for B.C. products
- Potential replacement markets for B.C. products
- Potential new markets for B.C. products
- Potential new products for B.C. wood
- Market promotion of B.C. species

As noted previously, information is needed on grade exports, end use statistics, etc.

Product Research Needs

Product production from alternative raw material grades and the economics of manufacture.

- Use of fall down products
- Promotion of individual products
- Instructions on proper application of individual products
- Standards research (building codes) on individual products
- Research on proper drying and shrinkage of various products
- Research on proper finishing of individual products
- In-situ requirements for components in manufactured wood products: ie. windows in Germany, etc., etc.

Equipment and Supply Infrastructure

* There are opportunities for specialty product equipment manufacturers and machinery manufacturing licensing agreements and these can be a viable approach to introduce and apply offshore technology.

* There is excellent B.C. 'process-control' technology developed and applied thus far in the industry.

Quality Control

* Sophisticated quality control programs are available.

* The skills to implement quality control are available.

* An opportunity exists to improve the dollar return through improved quality control and customer satisfaction.

* The need for direct customer/manufacturer interface will provide a more direct quality reporting relationship.

* The cost to implement quality control programs is relatively small.

By-Products

* Opportunities exist in the development of markets for by-products of the specialty products industry, i.e.
  - Presto Logs
  - Animal bedding, etc.

Limitations

Industry Use of Technology

* Research and development by industry is underfunded. Only .024% of gross revenues of the forest industry is applied to research and development.

* An overall strategy is lacking to support industry development (the indicated priority needs were previously shown).

* Industry technology is perceived to be developed elsewhere first.

* There exists a lack of confidence or security in the new uses of applied technology. The industry wants to be a 2nd-user.

* In applying or developing research, a significant financial risk of failure often exists.

- Many small businesses find it difficult to justify sophisticated and expensive equipment, possibly due to marginal profit levels, possibly due to relatively low utilization of individual processing lines and possibly due to uncertainty about future demand.

- The industry has insufficient knowledge of end-user product requirements or how its exports are used. This has limited the development of product and manufacturing/process research/technology.

- There is a lack of training programs directed to the set-up, maintenance and use of woodworking equipment.

- Flexibility is regarded as an advantage from a marketing viewpoint, particularly for custom remanufacturers but it has the potential danger of leading to less than efficient processing operations.

- There appears to be excessive movement of goods in process from one manufacturing plant to another, with attendant extra trucking and handling costs.

Equipment and Supply Infrastructure

- Canada has a low and decreasing 'self sufficiency' index in manufacturing forest products equipment.

- There are a lack of support programs to reduce the risk to 'first users' when implementing local, newly developed technology.

* Machinery product development costs are high with little available entrepreneurial capital.

* There has been a significant decrease in equipment machinery/fabrication and foundry operations and capacity in British Columbia.

Quality Control

* Employee attitudes and skills could be improved towards quality control.

By-Products and Waste

* Waste represents a significant cost for disposal.

* Increasing environmental concerns are being shown for continued dumping or landfill of solid wood waste, or any other means of disposal.

* Use of anti-stain chemicals in the primary and special product manufacturing sectors is of much concern in the processing of wood products and the disposal of by-products.

* More product and market research is required on by-products.

G. MARKETING, SALES AND DISTRIBUTION

Strengths

Marketing Promotion

- The Council of Forest Industries (COFI), with its related associations, is well structured and organized for product and species promotion on an offshore basis. COFI has done an excellent job in its promotional programs, in accelerating customer awareness and gaining acceptance of B.C. solid wood, offshore.

- Excellent promotional material has been developed for some products and for all major species.

- COMDP has been a successful initiative.

- Major companies have undertaken major marketing efforts of special products that are proprietary.

Sales

- Major lumber export organizations and agencies exist and either have the skills to sell specialty products or are organizing to do so.

- Many enthusiastic export and domestic agencies, wholesalers and brokers exist as a logical complement to commodity lumber shipments.

Limitations

- Marketing requires a re-orientation from 'selling what you make' to 'make what you sell' and if 'you don't make it right, you get it back'.
- There is no established distribution system and limited, if any, communication or interchange between the producer and end user.
- COFI has limited representation in North America.
- The industry has never employed the type of advertising/promotion service employed by "consumer" industries.
- There has not been a strong coordinated market development program for specialty products.
- The industry needs a "Utopian" sales organization which is not now in existence.
- There is an acute lack of awareness of the province as a value-added service or supply source in international markets.
- The British Columbia forest industry image in, and approach to, export markets has been one of an industry primarily dedicated to the housing market and not one of an industry committed to long-term customer service oriented requirements. As a result, the industry has had limited exposure to, and has little data related to the multitude of lumber end-uses and options available for both the Coast and

Interior species. Specifically, expertise and knowledge of specialty export sales, distribution methods, markets, end-uses and potential product applications are quite limited relative to the volume and variety of products which could be extracted from the "new shop" quality.

- Other major information 'gaps' include:
  - product demand pricing strategies (where not illegal)
  - industry grade export statistics
  - industry production statistics by grade and species.

- Commercial timber trade marketing functions are performed traditionally by major B.C. shippers and a few independent wholesalers. For the most part, the major shippers' marketing methods are structured for the distribution of commodities where grading rules are commonly understood and traditional selling practices are well established. Existing commodity distribution channels are not appropriate for specialty products.

- Exporters and wholesalers provide valuable services for remanufacturers in the form of export documentation, faster cash flow and general market comprehension. The need, however, for remanufacturers and customers to have a direct and mutual understanding of specialty items, many of which do not relate to industry grading rules, is made more difficult when wholesalers, exporters or importers are not familiar with the specialized needs of their respective clients.

- The marketing of specialty products requires that a close relationship and mutual understanding be developed between producer and consumer. Traditionally, B.C. producers manufacture in accordance with grade rules and tend to market through an extended distribution chain - wholesaler, importer, distributor, etc. This can make it difficult to fully develop the product really needed by the end-user (and which is worth more to him). Geographic distances are also a problem in this respect.

- The owner/manager is typically a "jack-of-all-trades", including that of a sales manager which limit the present selling and promotional efforts of independent product manufacturers.
- Foreign exchange rates are dynamic, which can lead to short term, 'spot market' exploitive or opportunistic marketing, all of which weaken long term trading relationships and continuity of supply.
- There is a general unfamiliarity with foreign customs, legal and trade tariffs, and non tariff trade restrictions.
- Few existing exporters have a complete understanding of the "reman" industry in terms of:
  - products needed
  - products possible
  - product prices
- Products are often sold without sufficient awareness of in-situ price competition.
- The province is seen as an inconstant, fragmented competitor particularly by competing regions with established trading patterns and longer term perpectives.

* Trade barriers exist in virtually every major market area. Duty, in general, is not a major barrier in comparison with non tariff constraints, exchange rate fluctuations, language and cultural differences and 'third world' credit advantages which exist for some competing countries.

* There is a general fear of stealing "secrets" among specialty product suppliers which add to the present fragmented approach.

* Too many agencies result in only "price" competition which depress the market.

* Lack of knowledge by independent sales agents confuse manufacturers and customers and create possibilities of claims notwithstanding good intentions of all parties.

* There is a need to upgrade and train sales personnel to effectively market specialty products. Commodity lumber traders and producers do not necessarily make effective sales representatives of 'downstream' end user wood products.

* There is a lack of a 'stocking' or 'inventorying' distribution approach to facilities for specialty products which may hinder development in some market regions.

In summary, the key advantages or strengths which favour the development of the specialty products sector relate to:

* the revenue and profit potential for value added manufacture;

* the quality, quantity and diversity of the timber resource;

- market demand both present and potential;
- a supportive political will to assist in further value added manufacture and marketing;
- The pre-eminent positioning of British Columbia as a lumber producer and exporter;
- The existance of a comprehensive and skilled support infrastructure which can be 'shaped' to specialty product needs directed to marketing production, technology supply and distribution;
- The efficiency of primary lumber processing and the concentration of major producers.

Some of the key limitations or constraints are:

- the general lack of recognition of awareness of the potential by the major producers which has led to a degree of inertia;
- the need for a reorientation in approach - a cultural shock;
- the lack of industry wide marketing and promotion;
- the absence of market knowledge and market data;
- the present deficiencies in selling, distribution and supply channels which are generally geared to commodity products and are not sufficiently sensitive to continuty of supply, meeting customer needs, maintaining quality, etc.

Provincial and industry advantages and strengths outweigh the limitations except for the need for a far more aggressive entrepreneurial approach, and the necessary market development.

The industry is competing for global markets in an ever-changing economic and political environment. Time and budget have not permitted an analysis of the major external forces impacting on export strategy. However, several of the key factors have been addressed throughout the report such as exchange rates, long term demand for softwood fibre, changing market forces or influences affecting demand for product and species, and local manufacture.

Key Issues

VIII THE KEY ISSUES

From the foregoing assessment of the industry and the analysis of the "business case", the following key strategic issues emerge:

- The Need for Continuous Market Strategy Formulation

  The re-orientation of the solid wood industry from one of predominantly commodity manufacture to a balanced mix of commodity and specialty product marketing/manufacture requires, in terms of specialty products, the development of new infrastructures such as supply and distribution services. The thrust of change for specialty products is primarily directed to marketing which will increasingly demand coordinated market strategies and policy formulation directed to each of the key market areas.

- Lack of Market Research and Follow-Up

  There have been numerous industry market research studies of solid wood specialty products directed to product applications in selected market regions which identify opportunity initiatives. Also, the industry is gaining penetration and product acceptance in the major export areas. However, at this emerging stage of market development, the overall approach is fragmented and uneven, being based on individual company initiatives, and characterized by a degree of 'not following up' on identifiable opportunities and not acting within a strategy and overall consideration of demand, supply and competitive factors, particularly competitive products.

  As noted previously, there is a paucity of industry information as regards end-user application of produced lumber, shipments of lumber by grade, etc. This type of market data is essential for the market strategy development of specialty product.

* Industry Perception and Awareness of Specialty Product Opportunity

As demonstrated, specialty product manufacture offers significant opportunity for added revenue and profitability. Although there is an emerging recognition of the 'business case' for specialty product manufacture by some lumber producers within the British Columbia forest industry, the comparative advantage of a 'value versus volume' approach is not yet sufficiently perceived to outweigh the risk or disadvantage. Advances are being made by certain of the major companies (largely using a custom-cutting approach), and approximately 30 percent of total specialty product manufacture is being done by primary producers in facilities contiguous to their 'primary' mills. The evolution, at this stage however, is relatively slow and the inertia of present behaviour patterns is a large factor for this lack of thrust. The companies, in general, view the value strategy as not having application to their particular business based on a number of factors and perceptions:

* the market is composed of diverse products with niches, small demand pockets, uncertain continuity;

* it is difficult to modify or interrupt the mill production process to accommodate the 'value' strategy and the cutting and sorting program required;

* the market development infrastructure is not in place;

* the sales/distribution infrastructure is inadequate;

* the extent of potential extra return on capital to be earned is not sufficient to justify the risk or the changes required;

* experience has shown specialty product manufacture to be non-profitable.

These factors have been addressed in the report. Industry inertia has also been due to insufficient analyses of production economics by primary producers to determine the profit advantage and application as applied to their particular operations.

Most recently, companies who do recognize the opportunity are seeking practical ways to implement such programs, i.e. how do we get started?

* Specialty Products Support Infrastructure

The forest industry is well served by a highly developed support/service infrastructure directed to member interests related to market promotion, standards, product and processing research, sales and distribution, export financing, etc. Specialty product manufacture, however, does not yet have a priority position within approved programs or organizational segments of these agencies. Also, the small, independent entrepreneur has limited access or representation to such services.

* Preoccupation with Definition

It is recognized that the specialty products sector is diverse in terms of product, process and degree of integration. This fragmentation has frustrated past efforts to classify and analyze the industry. However, the definition is not central to strategic exploitation of value added opportunity. What is important is developing a clear understanding of the nature of commodity and specialty product manufacture and marketing and the different approaches and requirements needed in these 'very dissimilar' businesses.

- Industry Concentration

  The high degree of industry concentration in both timber harvesting and lumber production has been noted. Apart from other considerations, this should be viewed as an advantage in implementing a re-orientation to added-value approaches and minimizing what may otherwise be fragmented, uneven and disruptive initiatives particularly in marketing and supply. Concentration also strengthens the conclusion that the primary lumber producer will play a dominant role in industry development of specialty products.

- Primary Processing for Specialty Product Manufacture

  Some primary processors do not clearly understand what is required in terms of mill capitalization, equipment or process reconfiguration, etc. to obtain improved values from initial log breakdown. It is generally perceived that major capital monies are needed either in headrig, sorting facilities and materials handling systems. This is not the case as demonstrated in the business case analyses.

  In many instances, quicker and better results can be achieved through process changes than through capital expenditure. Specialty product material can be removed from the primary process following initial log breakdown, and after each successive step in the manufacturing process.

- Profit Improvement Potential and Manufacturing Priority.

  Increased revenues and bottom line results can be achieved through improved log, fibre and grade recovery practices and capital investment programs directed to these areas. In some cases much greater potential profit opportunity is gained in the incremental revenue from added specialty product manufacture.

Before deciding on capital projects and allocation of capital monies, primary producers should consider the above priority on a site specific basis to their mills.

* 'Sort, Sort, Sort!'

Sorting of logs and lumber by species, grade and size is essential to obtaining value. This requires emphasis on sawing the log for specialty products rather than manufacturing special products as a by-product of the commodity-volume process. Sorting represents costs, and interruption of process flow. Without planning, these are incompatible with present mass production, low cost commodity approaches. The issue is how to introduce and integrate the sorting requirement into prevailing logging and lumber practices to achieve an optimum profit balance.

* Integration of the 'Two Industries'

The integration of the primary producer (big and small) and the specialty product manufacturer/entrepreneur in terms of synergistic arrangements viz. production, marketing and distribution is a desirable element to the future evolution and maturity of the value strategy. The 'two industries' are widely disparate, yet each has an essential role to play in developing the total potential: the primary, by virtue of size, fibre tenure, lumber production facilities and present position in commodity markets; the remanner, by virtue of flexibility, specialization, and ability to process small volumes.

The lack of concert (indeed, the lack of trust) existing between the primary producer and the reman operator is a major impediment to the growth of this important industry. Much of this lack of concert is a consequence of lack of awareness of the other's problems and opportunities. A way must be found to achieve an interdependence and mutual responsibility to each other and this can follow if a basis for dialogue can be developed.

The symposia suggested elsewhere in this report could be the means to set this in train.

* The Impact of Labour as a Factor

It is commonly believed that specialty wood product manufacture is labour intensive and that a non-union mill environment is decidedly advantageous in terms of lower costs and manning flexibility.

The labour content in the production of specialty products varies depending on the kind of product. While primary lumber processing generally requires a labour input of 4 hours per Mfbm, there is a wide spectrum of unit labour input in specialty products ranging from 0.5 hours for MSR processing to in excess of 13.0 hours per Mfbm for finger-jointing operations.

As a cost, labour may well represent 10 to 20 percent of the total manufacturing expense. While many independent operations are non-union, there is an increasing practice for these mills to be competitive with union rates while maintaining plant and scheduling flexibility. Plant and crew flexibility is essential as is worker commitment to product quality and productivity. While these attributes are not confined to non-union plants, it is essential to obtain union agreement to flexible crew scheduling and work assignment understandings in organized plants. In this regard, productivity incentives may be considered by company management as an approach to obtain added employee commitment.

- Bridging the Gap - The End-User and the Producer

Unlike the construction lumber market, specialty products require clear understandings as to what constitutes value to the end-user, how the product is processed, what part of the end-user process does the product fit, what sizes, shape, characteristics, etc. are essential, what packaging, supply needs are to be met, etc. At present, there are a number of 'filters' between the user and the producer which tend to limit this understanding. This is particularly true of countries such as Japan where large non-tariff barriers exist, e.g. culture, language, infrastructure, etc. The maturity of the specialty products industry will require the development of 'channels of communication and supply' via the marketing and distribution process.

- Present Adverse Market Perceptions

There remain certain adverse market perceptions of the British Columbia supply of specialty products related to past and present quality problems, interruptions in continuity of supply, not meeting specifications, lack of commitment to 'long term relationships', (short term opportunism), opportunistic activities by promoters, wholesalers or brokers, uninformed competition with importing country infrastructures (eg. going too far in vertical product manufacture), etc. These will have to be overcome in future development efforts.

- Fibre Cost and Supply

  Log costs on the Coast have dramatically increased over the past decade although costs have recently tended to stabilize. Interior log costs are now rising rapidly due, in part, to stumpage increases through revised timber pricing policies.

  In terms of lumber supply to the independent specialty product manufacturer (who has no direct access to tenure), there is an adequate supply from the primary to the independent, depending on the latter's ability to pay market prices (the price available to the primary through export or domestic sale). The problem is in the lower value end or 'scavenger' mill operator who frequently cannot afford the competitive price or cannot obtain access to sufficient volumes of grade/size/species required by his operation to maintain required inventory levels, and which the primary is able to provide only sporadically. This will become more of a problem as the primary improves grade recovery and sorting ability. This problem is a free-market one which has a direct bearing on the business feasibility of this kind of independent operation.

  Comment has been made on the need to sort and segregate logs and lumber for specialty product manufacture (as a separate issue).

- Long Term Commitment versus Short Term Opportunism

  Specialty product market acceptance requires a long term customer relationship, the development of which means the avoidance of short term opportunistic steps such as those related to quick, exploitation of foreign currency advantages with subsequent market exits, etc. The long term approach recognizes that the B.C. presence in any market region will be slowly developed over progressive stages of product and species acceptance and that there will be periods of comparative short term disadvantage. The kind of discipline needed to develop long term customer relationships is more difficult for the small entrepreneur than for the larger company.

* The Myth of 'Unlimited Opportunity in Every Direction'

There are frequently expressed views (usually by promoters or 'would be' entrepreneurs) on the unlimited market opportunities for British Columbia wood and special products; e.g. 15 million Buddhist priests need prayer plaques, etc. This perception tends to promote undue optimism as to profit and ease of entry in developing exotic export potential and clouds the 'real world' of the need of the successful entrepreneur to carefully:

- identify niches and market demand,
- access raw material sources and type which meet product requirements,
- develop an appropriate distribution and supply channel,
- put a suitable manufacturing facility 'in place',
- obtain needed financing (and develop a business plan to obtain such financing),
- manage material usage and control,
- provide a product that meets customer requirements as to quality, supply and price.

* Profitability

While profitability and rate of return potential is demonstrated in the various 'business case' models, and hypothetical projections, profitability is by no means assured in specialty product manufacture per se.

In addition to the needs listed above, key factors impacting net return relate to:

- Raw material management.

  Generally, 60 to 80 percent of the total direct cost of manufacture is in raw materials, i.e. lumber, depending on the nature and extent of the operations.

  Matching the product to the raw material and vice versa, control of waste, recovery, inventory and purchasing are fundamental. **Effective materials management is the single largest factor in business failure or success.**

- Labour utilization and cost.

  Labour costs represent from 10 percent to 20 percent of total operating cost. Quality control and productivity commitment are the two essentials.

- Overhead.

  Overhead generally constitutes 10 percent of total cost. The need to maintain a lean structure and low fixed costs are important.

- Pricing.

  Specialty product pricing is determined in large part by what the end-user perceives as value which includes the site specific 'economics' of the user of the product, in either displacing present supply or modifying operations within the user plant. Therefore, pricing is more negotiable and site specific to the customer than for commodity products. Also, the broker/wholesaler tends to influence prices. Much more analysis and research must be done to establish appropriate pricing strategies for specialty products in each market region. It may well be, that in initial market promotion and penetration, British Columbia producers have tended to underprice their products.

- Management Imperatives

There is nothing more important to the reman enterprise than management effectiveness. Typically, the size of the operation dictates that the manager must function, directly, in most phases of the operation because few independent companies will be large enough to afford experts in raw material acquisition, production control, labour relations, sales, administration etc., etc. The individual who can adjust his perspective from broad concepts to the 'hands on' detail of small orders and waste recovery is rare but without such talents in either one or a few persons, an enterprise can be defeated. Investors are usually aware of these important needs and without these management capabilites, finance as well as satisfactory relationships with suppliers and customers, may not be forth coming. The casualty rate amongst these enterprises may be high but, more importantly, the probabilities are that full measure of available profit will not be earned.

Business
Cases

IX THE BUSINESS CASE FOR SPECIALTY PRODUCTS

In this section, a number of different hypothetical representations of the economics or scenarios of specialty products are made to test the sensitivities of various factors. A number of analyses are made to demonstrate the critical elements effecting specialty product manufacture.

Basic primary and remanufacturing mill business cases are analyzed for mill economics, production statistics, and alternative cutting programs. Hypothetical mills for coastal hemlock, Interior SPF and lodgepole pine are demonstrated. Demonstration of the economics of hypothetical remanufacturing is also shown.

In the development of the business cases and subsequent analyses, we have proposed what we believe to be achievable results based on eclectic sets of circumstances. We have developed theories and models based upon experience, criteria and research which we believe to be accurate at this time. Assumptions such as mill design, process flows, unit prices, fibre recoveries, grade yields and markets, are the compendium of experience and broad consultation with experts in the industry, whose information we believe to be reliable.

However, time, monetary exchange factors, market conditions, peculiarities of fibre, mill, etc. may have implications on any of the assumptions and may alter the results shown herein, but not the conclusions. The reader is admonished accordingly.

A. APPROACH

In this section three typical primary mills are examined. They represent the major volume of species cut in British Columbia. Also, a reman plant is considered (Case D).

Coastal	hemlock	CASE A
Interior	SPF	CASE B
Interior	lodgepole pine	CASE C
Remanufacturing plant		CASE D

The three mills representing the species were conceived to be typical industry average mills constructed or rebuilt in the time period 1978-1980. They represent the state of technology existing at that time. Log scanning and process control are not used on the machinery and linear positioners are not considered.

Since these analyses are only a component of the overall study it was not possible under the terms of reference to perform an in depth review of this very complex situation. However we believe the analysis does indicate that a significant opportunity does exist and the analysis should be performed in greater detail on a species by species basis and a site specific basis.

Objective:

The objective of this exercise is to illustrate the effect of possible modifications of the long established log cutting programs and operating philosophies common in many operations.

Background:

It has been noted in previous sections of this report that the British Columbia industry became very committed to the U.S. dimension lumber market. Prior to this time the typical coastal sawmill produced a large variety of products and supplied a multitude of specialized customers. As labour costs increased, it effected operating cost in logging and sawmilling and slowly pushed the industry to streamline its operations. The commodity lumber market seemed to be the logical answer at that time to simplify operations and improve unit costs. More recently, there has been a trend back to diversifying markets and satisfying specific customer requirements. The present primary mill designs and operating programs however do not lend themselves to maximizing the product value because most mills are volume driven in an attempt to achieve the lowest possible operating costs.

Method

A simplified layout for each of these mills together with a description of the mill is presented. Basic production statistics, products and sales prices, manpower requirements and projected financial statements for the base line case in each mill were developed. The three mills were then modelled by the use of **SAWSIM**^{R} (Sawmill Simulation Computer Program) to come up with production statistics representative of the mill design and given log supply. The log supplies used in each of these mills are considered to be typical for each of the cases and are actual representations of real log distributions. It has been assumed in all scenarios that the base line mill is capable of processing the complete range of log diameters available in the species. For example, the coastal hemlock mill will process logs from 5" top diameter through to 60" diameter. An actual mill processing this range may utilize three primary breakdown machines to attain the required economic throughput. In order to keep the evaluations relatively simple, all of the models are two line mills.

With the use of **SAWSIM**, a couple of alternative log cutting patterns were developed for comparison with the base line case which used conventional log cutting patterns. These modified patterns were developed to satisfy the product lines considered to be suitable for an expanded remanufacturing industry operating in conjunction with the existing primary sawmill industry. The operations could be totally integrated with the primary mills or operate as 'stand-alone' facilities.

The following assumptions have been made to simplify the evaluations and maintain consistency of comparisons:

- log recoveries and shift production volumes used are based on net lumber sizes;
- dimension lumber prices have been adjusted to reflect the net lumber sizes used in SAWSIM;
- all prices and costs are in $(Canadian) FOB mill;
- the coastal mills only produce green lumber to reflect the average industry position at present;
- the base line mills in each case are assumed to cut 7/4" thickness for the major portion of production.

Details of mill description, key statistics and financial statements for each of the four cases will be found in Appendix 10. Since the hemlock case illustrates the potential to tie the primary mill into a remanufacturing plant, the details of such a reman facility are also included in Appendix 10 under Case D. The following text presents a summary and discussion of the results for each of these Cases.

B. CASE A - COASTAL HEMLOCK MILL

MILL DESCRIPTION:

This hypothetical grade cutting Coastal hemlock sawmill is a two line operation capable of processing logs from 5" top diameter to 60" diameter to a maximum length of 20 feet.

Logs are assumed to be delivered to the mill by water in bundles and introduced to the mill by a bundle side lift. The logs are debarked by means of two mechanical debarkers and are then bucked into sawlog lengths through a single cut-off saw line. It is assumed that log scanning is not used to optimize bucking lengths, thus these decisions are made by the operator with guidance from daily mill bucking instructions.

There are two primary breakdown machines; a nine foot double cut band mill with carriage to process logs from 18" diameter upwards. The majority of this wood demands grade cutting practices. The other primary breakdown machine is a six foot twin bandsaw fed by a sharp chain. This machine centre processes logs from 5" top diameter to 17" top diameter although it can handle a log up to 26" diameter.

The secondary breakdown machinery in this mill consists of two shifting edgers and a gang. The edgers process side boards from the primary machines and re-edge lumber from the line bar resaw when required. The bull edger associated with the 9ft. headrig is a 5 saw large machine with the capacity to process 12" thick cants. The gang is a wide machine which can be set up with two cutting programs (i.e. dimension on one side and grade cutting on the other.) The maximum depth of cut is 12".

A drop sorting station is located in the mill flow of lumber to the trimmers. This permits the grader to direct lumber requiring resawing or re-edging to the five foot line bar resaw or one of the two edgers. The majority of the lumber flow proceeds to the multi-saw trimmers. Lumber is fed onto lugs by means of a piece feeder and the operator supervising this machine is responsible for ensuring that the individual pieces are fed with the wane side up so the trimmer operator may make the best trimming decision. The lumber flow from the trim saws passes along a grading table prior to being fed into an automatic lumber sorter. The sorter operator keys in the grade marks as identified by the grades. The width, thickness and length of the pieces of lumber are automatically detected by sensors. The combination of this information allows the lumber to be directed to a specific bin and tallied. When the correct piece count for a load is reached, the bin is taken out of service until the lumber is discharged to the take away chains which transfer the loose pile of lumber to the lumber stacker. The stacked package may then be taken from storage transfers, by fork truck, to the yard inventory to await further processing or strapped and stenciled for rough green shipping.

Timbers and flitches from the headrig can be removed from the mill after grading and length trimming.

The average distribution of product from this mill is as follows:

12% -	Timbers and flitches	(30 Mfbm/shift)
16% -	Rough green	(40 Mfbm/shift)
72% -	Dressed green	(180 Mfbm/shift)

There are no dry kilns in this operation.

Waste material, chips sawdust and hog fuel are processed and shipped to local pulp mills by scow.

The planermill is a single line, sixteen knife machine capable of high production volumes. The lumber passes through a multi saw trimmer, after being graded. It is then sorted on a ten tray automatic lumber sorter. A pull chain is located under the trays to accommodate miscellaneous items which cannot be sorted in the trays. The lumber is stacked into final load sizes for finished product shipping and these loads are strapped and stenciled to suit customer requirements.

MILL PRODUCTION STATISTICS:

Production Volume - 250 Mfbm/shift, 2 shifts/day,
500 shifts/year
125 MMfbm/year.

Log Supply - hembal, 5" diameter
-60" diameter; 514,000m^3 year.

Lumber Recovery - 219 fbm/m^3 (Present)
This will be increased with capital expenditure and further training to 271 fbm/m^3.

Present sales values and grade recovery

	% Grade	$/mfbm *
- Economy	5	60.00
- Utility	10	160.00
- Structural	59	270.00
- Shop	17	550.00
- Clear	9	800.00

* Prices are for green lumber in $ (Can), F.O.B. mill.

Manpower summary

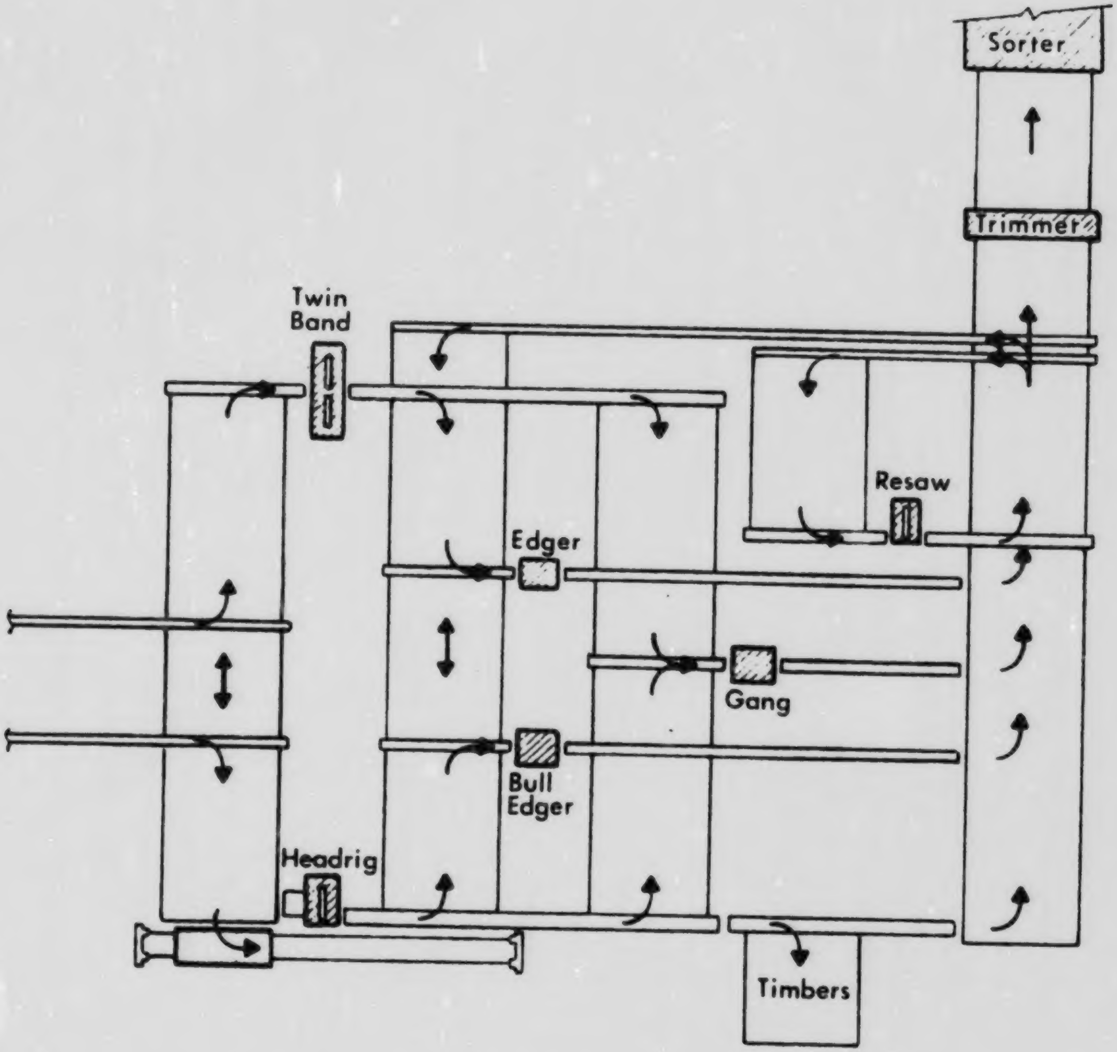
	Per shift	Per day
Sawmill	29	58
Planermill	12	24
Yard, shipping, security	6	16
Maintenance, sawfiling	8	40
Supervisors	3	8
TOTAL	58	146
STAFF	11	11
		157

MILL CAPITAL COST

It is assumed this mill was upgraded in 1978. The cost of the land and site infrastructure has been included. The technology utilized in the rebuild was modern but not to the degree of sophistication used today.

The estimated cost of the mill rebuild in 1978 was $30 million.

Figure 11


Sorter
Trimmer
Twin Band
Resaw
Edger
Gang
Bull Edger
Headrig
Timbers

TYPICAL COASTAL HEMLOCK SAWMILL

SUMMARY OF EVALUATION:

Alternative 1

The cutting program used to model the base line is considered to be entirely 7/4". This recognizes that most mills also produce varying quantities of merch cutting depending on the current market demand and prices. However, it assumes the side cuts or grade cuts are cut in the same size or multiple of the merch cutting. This practice is also common for the side cut material from grade logs, but the industrial remanufacturing market calls for sizes other than 7/4" or dressed 1½".

Alternative 2

This case assumes that all of the upper grade material (shop and clear) is sawn into 5/4" cuts to better satisfy the industrial remanufacturing market. The price difference used for this 5/4" material is $650.00 f.o.b. mill compared to $500.00 for 7/4" uppers. The centre cant of standard and better material and lower grades is still processed into 7/4" lumber for the dimension market.

Alternative 3

This case is identical to Alternative 2 but rather than cutting 5/4" lines on the headrig the log is only faced and then cut as a heavy upper grade flitch. This procedure is continued around all four faces of the log. The centre cant destined for dimension material is forced in the model to be the same size as in Alternative 1.

In all cases full taper sawing practice is used on grade logs to maximize recovery of upper grades.

The three comparisons utilize exactly the same log supply but in Alternative (2) the machine loading on the headrig and bull edger increases by 30%, which would slow down the mill production unless additional equipment was added. This emphasizes the comparison between volume and value recovery considering production in the coastal mill. In Alternative 2, the value and resultant profitability of the mill is greatly increased if the production can be maintained.

Alternative (3) removes large quantities of the upper grade material from the main mill flow at the earliest opportunity and processes these flitches in another fine kerf remanufacturing operation separate from the primary mill flow. As a result, the production of the primary sawmill increases and resultant costs are reduced. The grade flitches are removed to another less productive but more value-oriented facility with thinner kerfs. Value improvement in correct size cutting and grade improvement more than offsets the overall mill cost.

Table 23
SUMMARY OF RESULTS - HEMLOCK CASE

	Alt 1 base case (7/4 cutting)	Alt 2 5/4 uppers 7/4 centre cant	Alt 3 upper cants 7/4" centre cant
Volume/shift (fbm)	225,249	219,638	223,593
Lumber recovery (fbm/m^3)	191.3	185.6	189.9
Lumber value produced/shift	$ 81,194	$ 96,694	$ 98,823
By products value/shift	5,745	5,843	5,920
	86,939	102,537	104,743
Machine loading:			
Headrig (mins/shift)	413	548* Overloaded	238
Trimmers (pieces/min)	47	45	32 1.
Profit before taxes ($/Mfbm)	6.85	73.65*	82.04

* Impractical mill design that requires mill modification or reduction in production.

1.

Note comments p. 178.

Discussion

- It should be noted that the volume per shift and log recoveries are based on net lumber sizes. Both of these figures adjust upwards to reflect the tally gain resulting from cutting dimension lumber. This brings these average results up to 250Mfbm/shift and about 219 fbm/m^3 of log.

- It should be noted in Alt (1) the piece count through the trimmer is too high at 47/pieces/min. This will result in reduced grade and log recoveries. There will be an additional loss of high grade material through the edgers as much of the small odd shaped wane pieces inevitably go to the chipper in this type of mill.

- There is a gain in sales revenue of 18% by cutting 5/4" uppers lumber in Alt (2), but this is offset partially by the increased wood cost. The headrig in Alt (2) requires 33% more operating time than base case. This solution requires mill modification or reduction in production.

- A substantial gain in profitability is shown in Alternative (3) where the revenue increases by 20% above base case, but the headrig time decreases to 58% of base case. This would result in an increased volume per shift, if the logs were available, and a dramatic reduction in operating and fixed costs of about $50/Mfbm. The manning of the primary mill would remain the same as the base case. Improvements to profitability before taxes are shown to be $82 per Mfbm in this hypothetical example.

- The low volume, accurate cutting, reman operation, as shown in Alternative 3, will certainly increase grade and log recoveries because the reman operation is designed to carefully evaluate each cant to maximize the value of the cutting program. It is conceivable that 25%-30% of the primary mill volume would be removed in flitch form.

- In the reman operation, additional remanufacturing process steps could be included in the process flow of material, thus providing for further reductions in remanufacturing operating costs. For example, in this proposed reman operation, the material could be stickered for drying in the sorting operation, rather than going to a separate operation for stickering and drying.

Figure 12

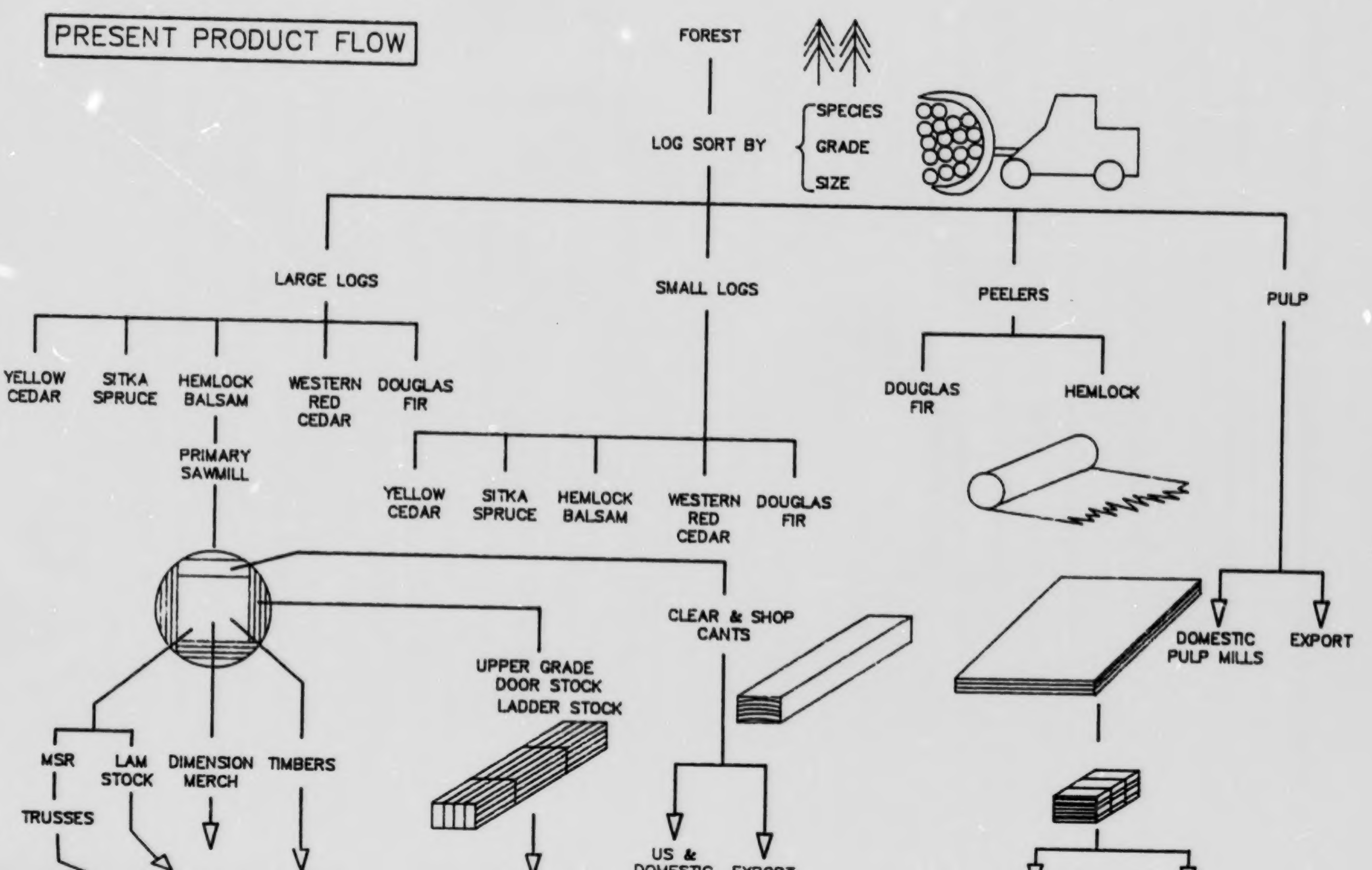
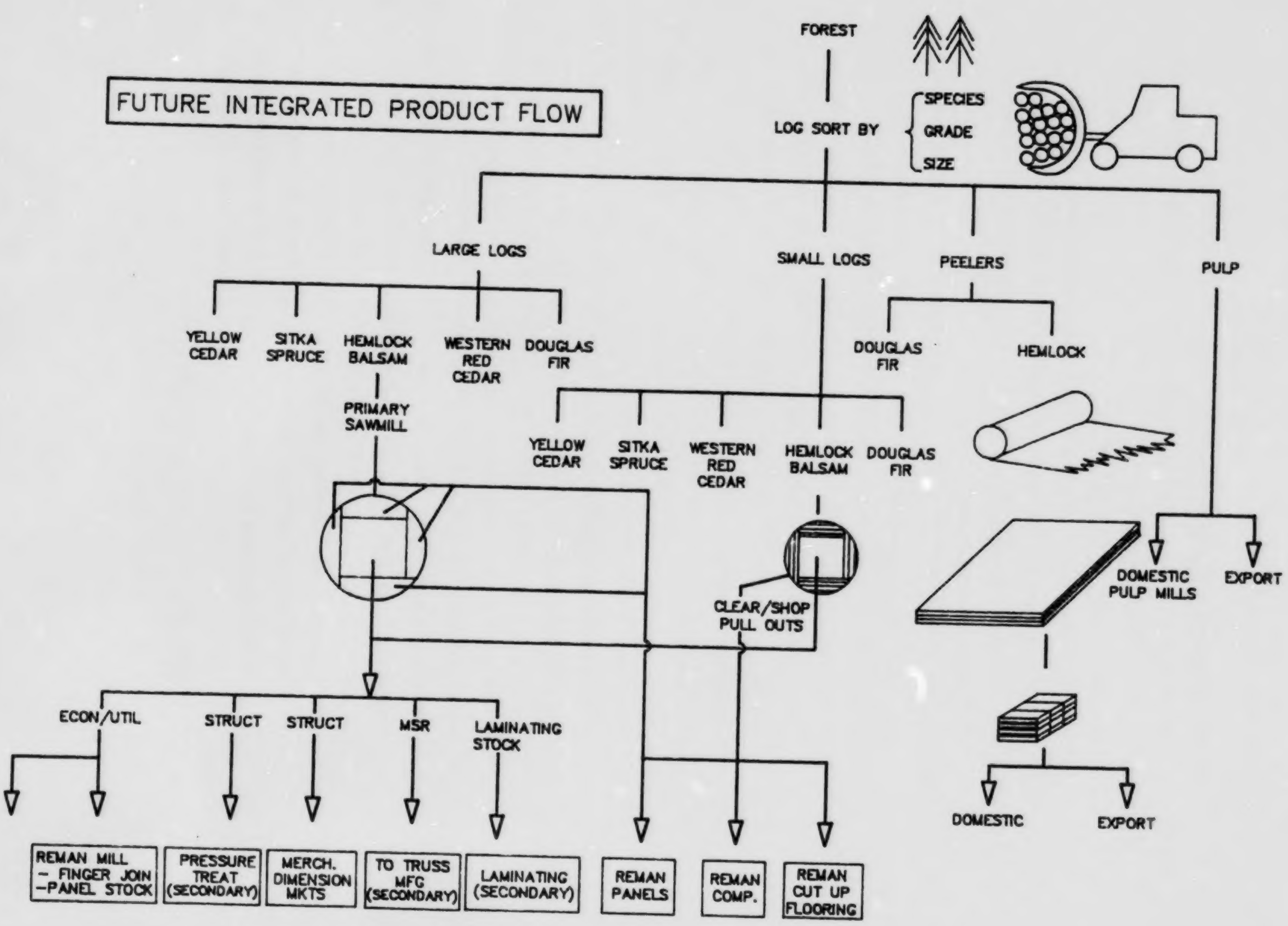

PRESENT PRODUCT FLOW
FOREST
LOG SORT BY
SPECIES
GRADE
SIZE
LARGE LOGS
SMALL LOGS
PEELERS
PULP
YELLOW CEDAR
SITKA SPRUCE
HEMLOCK BALSAM
WESTERN RED CEDAR
DOUGLAS FIR
PRIMARY SAWMILL
YELLOW CEDAR
SITKA SPRUCE
HEMLOCK BALSAM
WESTERN RED CEDAR
DOUGLAS FIR
DOUGLAS FIR
HEMLOCK
CLEAR & SHOP CANTS
UPPER GRADE
DOOR STOCK
LADDER STOCK
MSR
TRUSSES
LAM STOCK
DIMENSION MERCH
TIMBERS
US &
DOMESTIC PULP MILLS
EXPORT

Figure 13


FUTURE INTEGRATED PRODUCT FLOW
FOREST
LOG SORT BY
SPECIES
GRADE
SIZE
LARGE LOGS
SMALL LOGS
PEELERS
PULP
YELLOW CEDAR
SITKA SPRUCE
HEMLOCK BALSAM
WESTERN RED CEDAR
DOUGLAS FIR
PRIMARY SAWMILL
YELLOW CEDAR
SITKA SPRUCE
WESTERN RED CEDAR
HEMLOCK BALSAM
DOUGLAS FIR
DOUGLAS FIR
HEMLOCK
CLEAR/SHOP PULL OUTS
DOMESTIC PULP MILLS
EXPORT
ECON/UTIL
STRUCT
STRUCT
MSR
LAMINATING STOCK
DOMESTIC
EXPORT
REMAN MILL - FINGER JOIN -PANEL STOCK
PRESSURE TREAT (SECONDARY)
MERCH. DIMENSION MKTS
TO TRUSS MFG (SECONDARY)
LAMINATING (SECONDARY)
REMAN PANELS
REMAN COMP.
REMAN CUT UP FLOORING

C. CASE B - INTERIOR SPF MILL

MILL DESCRIPTION:

This typical B.C. Interior dimension sawmill is a two line operation capable of processing logs from 4" top diameter to 28" diameter to a maximum length of 16 feet.

Tree length stems are delivered to the mill by truck and introduced to the mill by a mobile log loader. The logs are debarked by means of three mechanical debarkers and are then bucked into sawlog lengths through a twin cut-off saw line. It is assumed that log scanning is not used to optimize bucking lengths, thus these decisions are made by the operator with guidance from daily mill bucking instructions.

There are two primary breakdown machines; a seven foot single cut band mill with carriage to process logs from 13" diameter upwards. The other primary breakdown machine is an older style Chip-N-Saw (CNS) four sided canter. This machine processes logs from 4" top diameter to 13" top diameter. The logs are fed horns down in the traditional infeed and are chipped in a split taper mode in the horizontal plane. The CNS canter is close coupled to a vertical arbor gang capable of cutting a 12" cant.

The secondary breakdown machinery in this mill consists of one shifting edger and a gang saw. The edger processes side boards from the headrig and re-edges lumber from the drop sort ahead of the trimmers. The gang is a conventional machine which is set up to cut dimension lumber to a maximum depth of 12".

A drop sorting station is located in the mill flow of lumber to the trimmers. This permits the operator to direct lumber requiring re-edging to the 3-saw board edger. The lumber flow proceeds to the multi-saw trimmers, ahead of which the lumber is fed onto lugs by means of a piece feeder and the operator supervising this machine is responsible for ensuring that the individual pieces are fed with the wane side up so the trimmer operator may make the best trimming decision. The lumber flow from the trim saws is transferred on lugs into an automatic lumber sorter. The width, thickness and length of the pieces of lumber are automatically detected by sensors. The combination of this information allows the lumber to be directed to a specific bin and tallied. When the correct piece count for a load is reached, the bin is taken out of service until the lumber is discharged to the take away chains which transfer the loose pile of lumber to the lumber stacker. The stacked packages are stripped for drying and taken from storage transfers, by fork truck, to the yard inventory to await kiln drying and further processing.

Residual chips are loaded onto truck or rail cars for shipment to market in pulpmills domestically or offshore. Sawdust and bark are burned on site.

The planermill is a single line, sixteen knife machine capable of high production volumes. The lumber passes through a multi-saw trimmer, after being graded. It is then sorted on a ten tray automatic lumber sorter. A pull chain is located under the trays to accommodate miscellaneous items which cannot be sorted in the trays. The lumber is stacked into final package sizes for finished product shipping and these loads are strapped and stenciled to suit customer requirements.

MILL PRODUCTION STATISTICS:

Production volume	- 250 Mfbm/shift, 2 shifts/day, 500 shifts/year 125 MMfbm/year.
Log supply	- spruce, pine, fir 4" diameter - 28" diameter; 525,000m^3/year.
Lumber recovery	- 238 fbm/m^3 (Present) This will be increased with capital expenditure and further training to 309 fbm/m^3.

Present sales values
and grade recoveries

	% Grade	$/Mfbm *
- Economy	5	50.00
- Utility	10	120.00
- Structural	83	230.00
- Shop/clear pullouts	2	380.00

* Prices are for KD dressed lumber in $ (Can), F.O.B. mill.

Manpower summary

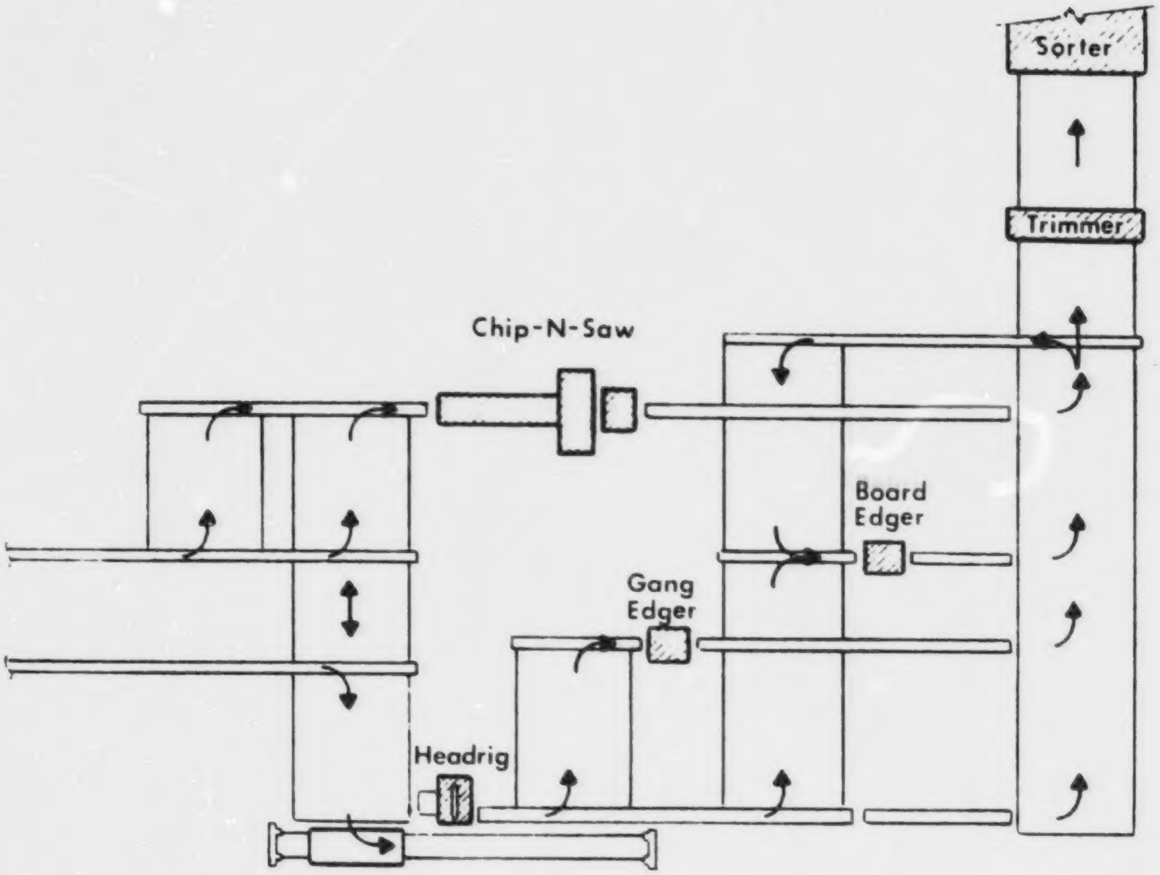
	per shift	per day
Sawmill	18	36
Planermill	11	22
Yard, shipping, security	8	20
Maintenance, sawfiling	5	25
Supervisors	1	7
TOTAL	43	110
STAFF	11	11
		121

MILL CAPITAL COST

It is assumed this mill was built in 1978. The cost of the land and site infrastructure has been included. The technology utilized in this mill construction was modern for its day, but not to the degree of sophistication used today.

The estimated cost of the mill built in 1978 was $22 million.

Figure 14


Sorter
Trimmer
Chip-N-Saw
Board Edger
Gang Edger
Headrig

TYPICAL INTERIOR SPF SAWMILL

SUMMARY OF EVALUATION:

This Interior mill is a much simpler case than the typical coastal sawmill. Basically the SPF log supply is well suited to the commodity dimension market although there is still room for further diversification by:

- producing special sizes to suit specific offshore markets;
- diversification of product in the North American markets; (e.g. increasing quantity of laminating stock, MSR, pressure treated lumber and finger jointing)
- diversion of material that cannot be processed in finished form in the primary sawmill to other facilities to extract higher values;
- optimal production planning facilitates maximizing the primary sawmill sorts and grades, but also considers the use of other remanufacturing facilities either on-site or in different facilities, to maximize the value production from a given facility.

The base line evaluation prepared for the typical SPF mill will be used as the bench mark in reviewing Case C, lodgepole pine.

Table 24
SUMMARY OF RESULTS - SPF

	BASE CASE (7/4" cutting)
Volume/shift (fbm)	220,446
Lumber recovery (fbm/m^3)	210.8
Lumber value produced/shift	$ 55,676
By products value/shift	$ 6,004
Machine Loading:	
Headrig (mins/shift)	340
Profit before taxes ($/mfbm)	56.30 [1]

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[1] Note comments p. 178.

D. CASE C - INTERIOR LODGEPOLE PINE MILL

MILL DESCRIPTION:

In this alternative, the separation of lodgepole pine as a specialty product, from the SPF, spruce-pine-fir in log form in the forest operations is considered. This pine product is then projected to be manufactured primarily as furniture stock for the European and domestic 'redwood market'.

This typical B.C. Interior dimension sawmill is a two line operation capable of processing logs from 4" top diameter to 22" diameter to a maximum length of 16 feet.

Tree length stems are delivered to the mill by truck and introduced to the mill by a mobile log loader. The logs are debarked by means of three mechanical debarkers and are then bucked into sawlog lengths through a twin buck saw line. It is assumed that log scanning is not used to optimize bucking lengths, thus these decisions are made by the operator with guidance from daily mill bucking instructions.

There are two primary breakdown machines; a seven foot single cut band mill with carriage to process logs from 12" diameter upwards. The other primary breakdown machine is an older style three sided canter. This machine processes logs from 4" top diameter to 11" top diameter. The logs are fed horns down in the traditional infeed and are chipped in a split taper mode in the horizontal plane.

The secondary breakdown machinery in this mill consists of one shifting edger and a gang edger and a twin band resaw. The edger processes side boards from the headrig and re-edges lumber from the drop sort ahead of trimmers. The gang is a conventional machine which is set up to cut lumber to a maximum depth of 12".

The 5' twin band resaw permits the further breakdown of cants with thinner kerf saws in the most effective way to maximize market requirements. This machine has a recirculating capability.

A drop sorting station is located in the mill flow of lumber to the trimmers. This permits the operator to direct lumber requiring re-edging to the 3 saw board edger. The lumber flow proceeds to the multi-saw trimmers, ahead of which the lumber is fed onto lugs by means of a piece feeder and the operator supervising this machine is responsible for ensuring that the individual pieces are fed with the wane side up so the trimmer operator may make the best trimming decision. The lumber flow from the trim saws is transferred on lugs into an automatic lumber sorter. The width, thickness and length of the pieces of lumber are automatically detected by sensors. The combination of this information allows the lumber to be directed to a specific bin and tallied. When the correct piece count for a load is reached, the bin is taken out of service until the lumber is discharged to the take away chains which transfer the loose pile of lumber to the lumber stacker. The stacked packages are stripped for drying and taken from storage transfers, by fork truck, to the yard inventory to await kiln drying and further processing.

Residual chips are loaded onto truck or rail cars for shipment to market in domestic pulpmills or offshore. Sawdust and bark are burned on site.

The planermill is a single line, sixteen knife machine capable of high production volumes. The lumber passes through a multi-saw trimmer, after being graded. It is then sorted on a ten tray automatic lumber sorter. A pull chain is located under the trays to accommodate miscellaneous items which cannot be sorted in the trays. The lumber is stacked into final package sizes for finished product shipping and these loads are strapped and stenciled to suit customer requirements.

MILL PRODUCTION STATISTICS:

Production volume - 180 Mfbm/shift, 2 shifts/day,
500 shifts/year
90 MMfbm/year.

Log supply - lodgepole pine
4" diameter
- 22" diameter; 410,000m^3/year.

Lumber recovery - 220 fbm/m^3 (present)
This will be increased with capital expenditure and further training to 260 fbm/m^3.

Present sales values
and grade recoveries

	% Grade	$/Mfbm *
- Economy	10	50.00
- Utility	10	120.00
- Structural	20	230.00
- Tight knot furniture grade	60	470.00

* Prices are for dressed lumber in $ (Can), F.O.B. mill.

Manpower summary

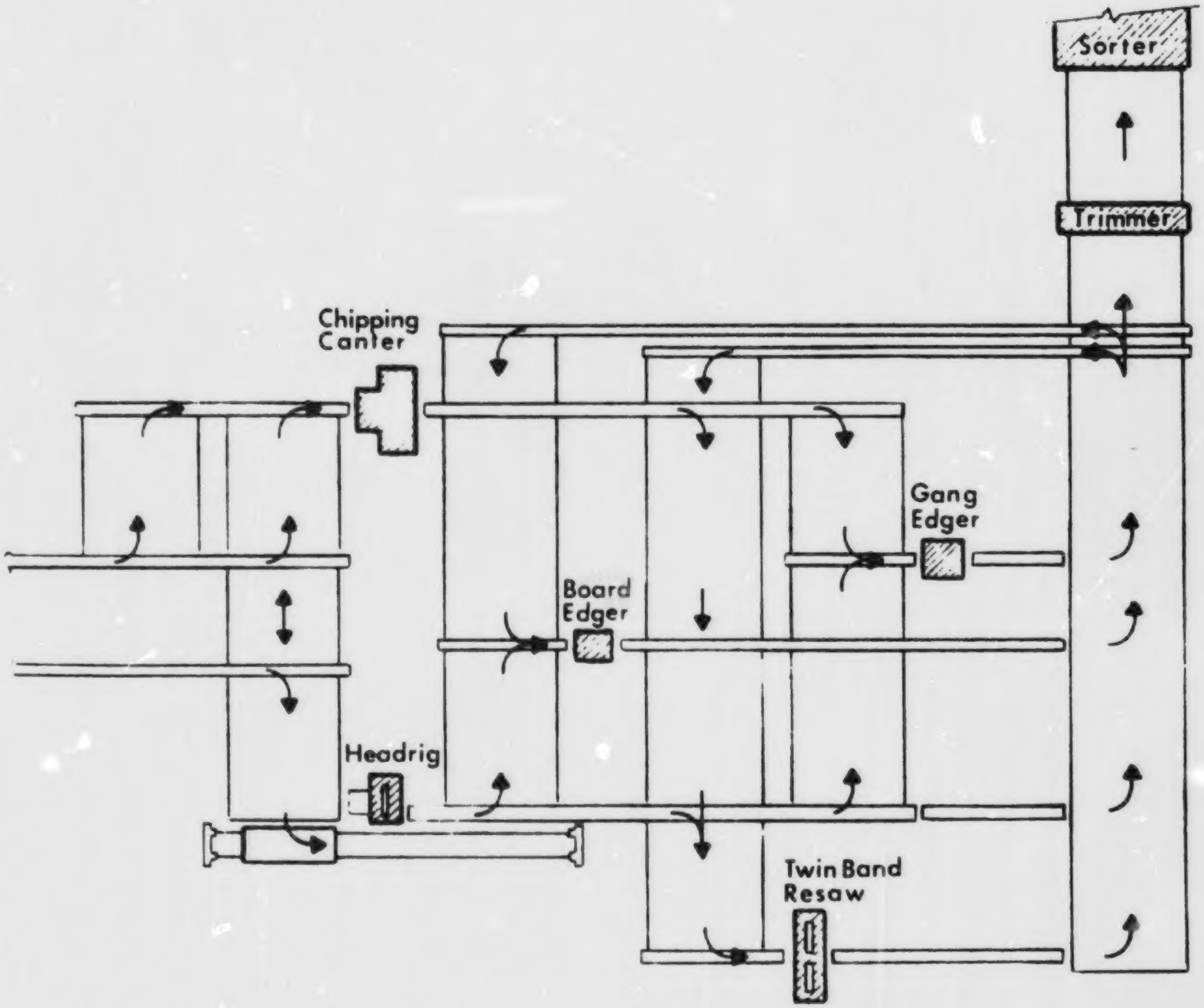
	per shift	per day
Sawmill	17	34
Planermill	11	22
Yard, shipping, security	8	20
Maintenance, sawfiling	5	25
Supervisors	1	7
TOTAL	42	108
STAFF	10	10
		118

MILL CAPITAL COST

It is assumed this mill was built in 1978. The cost of the land and site infrastructure has been included. The technology utilized in this mill construction was modern for its day, but not to the degree of sophistication used today.

The estimated cost of the mill built in 1978 was $22 million.

Figure 15


Sorter
Trimmer
Chipping Canter
Gang Edger
Board Edger
Headrig
Twin Band Resaw

TYPICAL INTERIOR LODGEPOLE PINE SAWMILL

SUMMARY OF EVALUATION:

The furniture market calls for a tight knot grade and the principal sizes require boards developed from 5/4" cuttings, or other sizes not compatible with 7/4" dimension cuttings.

The lodgepole mill is very similar to the SPF mill for obvious reasons; the average log size is smaller than the spruce, ranging from 4" top diameter to 22" top diameter. For this reason the average mill throughput will be lower than a conventional SPF mills.

The following alternatives are addressed:

Alternative (1)	Base line case - SPF Mill.
Alternative (2)	Lodgepole pine mill on a combined 5/4" and 7/4" sawing program to produce about 60% tight knot furniture grade. This material will develop from side cuts and centre cants. In this case all the material is processed in the primary sawmill.
Alternative (3)	The program is identical to Alt (2) but some of the 5/4" product is produced in a separate reman operation.

Table 25

SUMMARY OF RESULTS - LODGEPOLE PINE

	Alt (1)	Alt (2)	Alt (3)
	Base case (SPF 7/4")	(60% 5/4" 40% 7/4")	(As in 2 but some 5/4" in reman plant.)
Logs/shift	3371	3273	3273
Lumber volume (Mfbm/shift)	219.3	177.0	179.3
Lumber recovery (fbm/m^3)	209.8	221.2	224.1
Lumber value ($/Shift)	47,147	63,941	64,801
By-products value ($/shift)	6,039	4,343	4,268
	53,186	68,284	69,069
Machine loading: (edger)	OK	Overloaded	OK.
Profit before taxes ($/mfbm)	$ 58.01	$ 145.65	$ 153.44

DISCUSSION OF RESULTS:

- The lumber volume/shift and recovery reflect the fact that net lumber sizes are used in the evaluations. The SPF mill would produce close to 250 Mfbm/shift on a full count basis and the recovery would be 261 fbm/m^3.

- The lodgepole pine mill produces about 20% less volume per shift with about the same log count.

- The product value in the lodgepole pine mill is 25% higher than that of the dimension mill which more than compensates for the higher production costs as shown by the gross profit figures. (250% higher.)

E. CASE D - REMANUFACTURING PLANT

INTRODUCTION

The scope of remanufacturing is discussed extensively elsewhere in this study. The purpose of this case is to demonstrate the concept and economics of the type of operation necessary to process the higher grades of material as outlined in Case A, the hemlock mill.

It should be recognized that most of the processing carried out in the remanufacturing plant can be done in a primary sawmill if time and cost permit. The remanufacturing facility as proposed, can be part of the primary sawmill, or a separate entity. Preferably, the facility is not linked physically with the primary sawmill, but instead, is a separate unit where close control on quality and revenue recovery can be monitored. This separate unit permits more time to be taken to make cutting decisions and recover the smaller pieces of lumber of higher value. The volume-oriented primary sawmill is not suited to perform this efficiently for the many sizes and grades required in small volumes.

DESCRIPTION

The following steps are involved in the hypothetical reman operation as developed for the purpose of this study:

- flitch or cant grading and sorting;
- resaw breakdown of cants;
- sorting and grading of material;
- stripping and stacking;
- kiln drying (usually to 12-14% MC);

- dressing or profiling;
- possible resawing or multi-ripping;
- grading and sorting;
- cut up into components or for finger jointing;
- finger jointing facility.

Many other remanufacturing operations are possible. Any combination of the operations is also possible in any one operation. However, this is the combination used in this hypothetical facility.

A remanufacturing operation will consist of a number of machine centres that are operated independently of one another. Not all machines need to operate at the same time.

In a remanufacturing operation, it is essential that operating control be maintained on a process by process basis or for each run. Numerous variables, including the raw material, the remanufacturing process, the products derived, and the market place need to be assessed for profitability before each run and monitored closely during the run. Simple computer models greatly assist in doing the repeated calculations required for this run control.

Some typical remanufacturing control reports are shown.

Figure 16

TYPICAL REMANUFACTURING RUN CONTROL REPORTS

```
                  RUN REPORT

      RUN NO: M                                   RUN DATE:OCT   . 1987

     PRODUCT: 1x6 SHIPLAP T

FRODUCT INPUT  SOURCE                  DATE                             FBM      %     PRICE    TOTAL       %
                            OCT 27     TRIM                                    VOLUME           DOLLARS     $
1X6 S1S T                     7016                                      7016    100%    422     $2,961     100%
                                                                           0      0%                $0       0%
                                                                           0      0%                $0       0%
                    0         7016        0          0          0       7016  100.00%           $2,961  100.00%
---------------------------------------------------------------------------------------------------------------
  COSTS:                                                                9355 M/SHIFT
DIRECT LABOUR NO. MEN       0       2        1          0          0
        HOURS               0     4.5      1.5          0          0    0.75 SHIFTS
COST PER MAN HOUR       $0.00  $32.66   $32.66      $0.00      $0.00
DIRECT LABOUR COST         $0    $294      $49         $0         $0    $343

MANUFACTURING OH                  $56       $0         $0         $0     $56

TOTAL MFG COST             $0    $350      $49         $0         $0    $399  $56.90 /MFBM

TOTAL COST                                                          STD =                    $3,359.93
TOTAL COST/MFBM                                                                 60              $479
===============================================================================================================
OUTTURN:                               DATE                                     % OF            TOTAL        %      JOINT
   PRODUCT      GRADE       OCT 27     TRIM                             FBM     INPUT   PRICE   DOLLARS      $      COST
1x6 RL SHIPLAP T             6,941                                     6,941      99%   $546    $3,787     100%     484
1X6 RL SHIPLAP TRIM            100     (100)                               0       0%   $200        $0       0%     178
                                                                           0       0%     $0        $0       0%       0
                                                                           0       0%     $0        $0       0%       0

TOTAL OUT                  0 7,041     (100)        0          0       6,941   98.93%           $3,787   $539 /M
TRIM LOSS                                                                 75    1.07%

  PROFIT                                                                                          $427
 PROFIT MFBM                                                                                       $60
0
```

```
                         RUN REPORT

   RUN NO: R-                                   RUN DATE:

   PRODUCT: 2-7 BXR HE

PRODUCT INPUT SOURCE               DATE                      FBM      %      PRICE    TOTAL       %
                                                                    INPUT             DOLLARS     $
1-7 B/S-HEMSHOP        27544                                 27544    40%     552     $15,744    48%
2-7 BXSHEMSHOP         3407     20049                        30456    57%     497     $15,010    52%
                                                                       %                $          0%
                                                                       %                $          0%
                       47798    20641                        68420   100%             $31,55    100%
-----------------------------------------------------------------------------------------------------------
   COSTS:                                                    DRAFT M SHIFT
DIRECT LABOUR NO. MEN       7        7      0      0      0
       HOURS                8        5      0      0      0  1.625 SHIFTS
COST PER MAN HOUR      $75.48   $66.58  $0.00  $0.00  $0.00
DIRECT LABOUR COST     $1,[illegible]   $1,281      $      $      $  $2,079

MANUFACTURING OH         $751     $468      $      $      $  $1,219

TOTAL MFG COST         $1,749   $1,749      $      $      $  $3,498  $49.81 /MBF

TOTAL COST             $31,498        TRAINING                   [illegible]       5         $35,047.23
TOTAL COST/MFBM                                                                                   $591
===========================================================================================================
OUTPUT:                                    DATE                       %                  TOTAL        %     JOINT
   PRODUCT      GRADE                      ADJ COUNT SHO       FBM    INPUT   PRICE      DOLLARS      $     COST
2-5/8X6 HEM   2+BLR    6,529    4,551   1,7[illegible]             12,478     20%    $904     $12,044      30%    873
2-7/8X6 HEM   3 BLR    6,2[illegible]    10,031                      16,797     25%    $655     $10,258      26%    [illegible]
2-7/8X6 HEM   WLONG    1,444    [illegible]                      6,451     10%    $650      $4,193      10%    [illegible]
2-7 BX6 HEM   ECONOMY  6,107    4,540                      15,799     25%    $623      $9,874      24%    577
2-7 BX6 HEM   #2 #3    2,410    5,407                       5,755     10%    $495      $2,781       7%    405
2-7 BX6 HEM   CUTS     [illegible]    1,021                       1,407      4%    $2[illegible]      $456       1%    135
              TRIMS                                                  0%    $4[illegible]        $          0%    135
                                                                     0%      $         $0         0%
                                                                     0%      $         $0         0%
TOTAL OUT              16,577   24,036   1,7[illegible]             62,919  47.56%              $41,215    $640/M
TRIM LOSS                                                  15,501   2.36%

   PROFIT                                                                               $8,167
 PROFIT/MFBM                                                                               $50
```

DESIGN

Production Statistics:

Annual Volume 40 MMfbm.
2 shifts/day; 250 days/year; 80 Mfbm/shift.
Dry Kilns: 30 MMfbm/year

Position	Per Shift	Per Day
Tilt Hoist Operator	2	4
Resaw Operator	1	2
Twin Resaw Operator	1	2
Drop Sort Operator	1	2
Grader	3	6
Chain Pullers	6	12
Packaging Operator	2	4
Filer (Grinder)	1	3
Shipper/Tally	2	3
Maintenance	2	4
Clean Up	1	3
Forklift Operator	4	8
Trimmer Operator	4	8
Planerman	1	2
Planer Infeed Tilthoist	1	2
Kiln Stacker Operator	1	2
Finger Joint Operators	6	12
Total Crew:	39	79

Capital Cost:

The estimated cost for this facility including land and services is $8 million.

REMANUFACTURING FACILITY

Typical Annual Operating Statement

Annual Production: 40 mfbm/year finished product on 2 shifts. 240 days/year.

		Unit	Per year ($ 000)	$/Mfbm
Revenues:	Lumber sales	40 MM	44,000	1100.00
	Custom processing	-	-	
Cost of Sales:	Raw material		25,300	632.50
	Labour cost ($17.00 rate plus 30% benefits)	49 men	3,352	83.80
	Operating supplies		672	16.80
	Maintenance supplies		536	13.40
	Utilities		680	17.00
	Variable costs (Sub Total)		5,240	131.00
	Administration & fixed		712	17.80
	Sales costs		160	4.00
	Depreciation		720	18.00
	Financing costs		900	22.50
Total Cost			33,032	825.80
Profit (before taxes)			10,968	274.20

SUMMARY OF EVALUATION:

There appears to be a good case for simplifying the primary sawmill operation and removing certain grades of wood from the mill at the appropriate time in order to minimize primary manufacturing costs and maximize the fibre recovery and sales values.

The existing investment in major primary coastal sawmill complexes is substantial and the return from this must be maximized. It does not seem prudent to spend additional large capital on the mills to increase the flexibility of product recovery. This would increase the complexity and operating costs of the facilities. Rather, it is suggested that the log input volume be increased and specialty product material be removed from the operation as quickly as possible, thus providing more capacity at the back end of the mill to accommodate the additional structural content of the logs.

DISCUSSION

A remanufacturing plant processing the specialty product material will improve recovery and value of product because:

* a small highly trained crew is dealing exclusively with high value product;

* the mill is designed for one or more machine centres. This machinery selection can be refined to give the best compromise between saw kerfs and feed speeds, ensuring accurate cutting with the best recovery;

* The time factor in the operation will permit careful grading and selection of cutting pattern for each cant, thereby maximizing return on each cant;

- The selected pieces of specialty product material can be further processed in the reman plant on a suitable machine, thus improving overall recovery. Much of this small material is lost in the primary sawmill.

The attached flow sheet shows a typical arrangement for a plant capable of processing about 40 mmfbm/year of material on a two shift basis.

The primary breakdown machine would be a 5' twin band resaw station, equipped with good cant handling equipment and a recirculation set-up. Additional primary breakdown functions could be performed by a 4' line bar resaw. This machine could be run in series with the planer machine to provide additional finishing resaw capacity.

A good quality moulder machine, capable of providing a high quality of finish, would be equipped with an efficient load breakdown and infeed table to permit smooth effective presentation of material to the moulding machine.

The degree of sorting capability required for this facility would need to be evaluated, but some automated sorting would probably be justified in this size of operation. A grading station and length trimming capability would be located ahead of sorting.

A lumber stacker would be tied into the sorter, and this machine center could accommodate random loads pulled from the sorting chain. This stacker would be used to package finish loads and for stripping of lumber loads prior to drying.

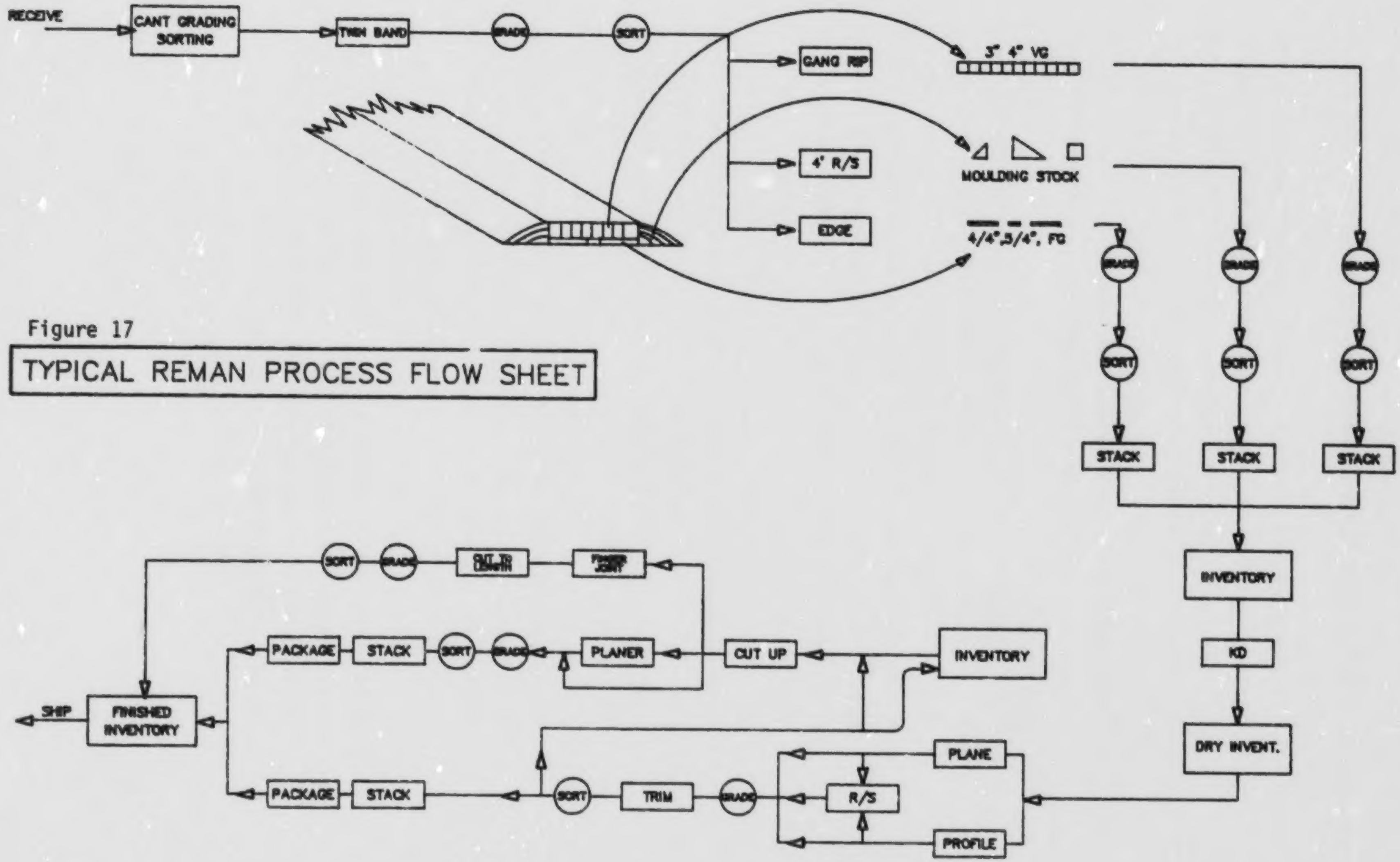

RECEIVE
CANT GRADING SORTING
TWIN BAND
GRADE
SORT
GANG RIP
4' R/S
EDGE
3" 4" VG
MOULDING STOCK
4/4",5/4", FG
GRADE
SORT
STACK
GRADE
SORT
STACK
GRADE
SORT
STACK
INVENTORY
KD
DRY INVENT.
PLANE
R/S
PROFILE
GRADE
TRIM
SORT
STACK
PACKAGE
INVENTORY
CUT UP
PLANER
GRADE
SORT
STACK
PACKAGE
FINGER JOINT
CUT TO LENGTH
GRADE
SORT
FINISHED INVENTORY
SHIP

Figure 17

TYPICAL REMAN PROCESS FLOW SHEET

The plant would be equipped with sufficient kiln drying capability to handle at least 60% of the product. These kilns would be equipped with the best control equipment to ensure precise quality drying and maximum utilization.

A separate facility adjacent to the main lumber sorting equipment would accommodate an efficient automatic cut-up line with high quality electronic scanning. After cut-up, the material may be sorted for shipping or further processing or may be transferred directly to a finger jointing line. Finished product packaging would require high quality equipment to carefully band, wrap and identify the higher value finished product.

Waste wood would be hogged for disposal in land fill or power boilers in the nearby area.

The remanufacturing process is highly sensitive to the following:

- raw material price and grade recovery;
- market prices;
- process flow and resultant costs.

It should be noted that the labour costs represent only 10 to 20 percent of the total costs of the operation.

Provincial Implications

X. HYPOTHETICAL PROVINCIAL IMPLICATIONS OF APPLYING SPECIALTY PRODUCT MANUFACTURE

In this section, an analysis is made of the potential measurement of the value to be extracted from the fibre of the forest resource in solid wood products in British Columbia. This potential is based on a number of assumptions that are detailed in the report. Any changes to these assumptions will of course alter the suggested measurement of values to be extracted.

It is emphasized that the data is indicative of what can be accomplished 'site specific' and the impracticability of assuming that the total species harvest can be so re-directed is palpable.

In this section, and with the above caveat, the following data and analysis are presented:

- List of assumptions
  - log costs
  - fibre recovery for present mill practice
  - proposed potential recovery with no capital applied to primary sawing
  - proposed potential recovery with capital applied to primary sawing
  - lumber sales values
  - manufacturing costs
  - other assumptions
- For each species in British Columbia, an analysis has been made of a suggested revenue increase that is possible from improvements to fibre recovery, grade recovery, and specialty product manufacture in the primary sawmill and subsequent remanufacturing facilities.

  - proposed improvements in log or fibre recovery
  - proposed improvements in grade recovery
  - proposed product distribution or improvement
  - summary of proposed revenue improvements
  - summary of provincial effect
  - graphical presentation of data

- For each species, consideration was given to developing data to represent the base case or basis from which improvements are made. This does not attempt to measure all the different products that are currently being produced.

- For each species, a projection was made of a theoretical improvement possible to fibre and grade recovery without any capital expenditure in the primary sawmill. A hypothetical projection was made of the potential product distribution with new or marginal volumes of present specialty products. This projection of new product distribution was based on the base case fibre and grade recoveries.

- For each species, a third projection was made on the assumption that capital will be spent on the primary sawmill to improve the fibre and grade recovery. In addition, capital will have to be spent on remanufacturing facilities.

- Two graphical presentations are made for each of the species

  - The first graph illustrates the changes in revenues and operating cost in a typical operating situation.

  - The second graph illustrates the changes in grade distribution and product distribution, resulting from further remanufacturing. The composite value expressed in the third case (remanufacturing with capital) includes some of the gain in grade distribution already being achieved in the primary sawmill.

Table 26

TABLE OF PROPOSED LOG COSTS

SPECIES	$/M3
COASTAL HEMLOCK	50.00
COASTAL DOUGLAS FIR	62.00
SITKA SPRUCE	93.00
WESTERN RED CEDAR	68.00
YELLOW CEDAR	190.00
SPRUCE/PINE/FIR	26.00
LODGEPOLE PINE	26.00
INTERIOR CEDAR	30.00
INTERIOR HEMLOCK	30.00
INTERIOR DOUGLAS FIR	30.00

The costs are considered to be reasonably typical of the present industry experience but do not necessarily include recent adjustments to stumpage. The same costs are maintained throughout all of the comparisons and form the basis for consistently measuring and assessing processing product alternatives. These approximations **are meant for relative economic analyses.** Individual site specific cost and recovery data must be used to determine absolute profitability in each specific mill situation.

Table 27

TABLE OF POTENTIAL LOG RECOVERY

SPECIES	PRESENT (BASE) (%)	NO CAPITAL (%)	WITH CAPITAL (%)
COASTAL HEMLOCK	45	49	56
COASTAL DOUGLAS FIR	49	53	58
SITKA SPRUCE	47	51	55
WESTERN RED CEDAR	43	47	51
YELLOW CEDAR	47	49	55
SPRUCE/PINE/FIR	44	48	55
LODGEPOLE PINE	43	48	55
INTERIOR CEDAR	42	44	50
INTERIOR HEMLOCK	42	44	50
INTERIOR DOUGLAS FIR	45	48	54

These percentages represent the net lumber produced from a cubic volume of log input. The detail spread sheet for each species shows the equivalent recoveries expressed in fbm/m^3 and nominal.

TABLE OF PROPOSED LUMBER REVENUES

This table of revenues for each product in each species is considered to be representative of current markets. These values have been maintained throughout all of the scenarios considered in the theoretical examination.

A limited number of remanufacturing options have been shown. Some remanufacturing revenues have been discounted to reflect the manufacturing fibre loss.

Table 28

TABLE OF LUMBER REVENUES USED

CANADIAN DOLLARS FOB MILL ($/Mfbm)

PRODUCT	COASTAL SPECIES HEMLOCK	DOUGLAS FIR	SITKA SPRUCE	WESTERN RED CEDAR	YELLOW CEDAR	INTERIOR SPECIES SPRUCE/ PINE/ FIR	LODGEPOLE PINE	CEDAR	HEMLOCK	DOUGLAS FIR
EXPENDABLE:										
ECONOMY	60	80	90	40	50	50	50	40	40	60
UTILITY	160	170	180	120	120	120	120	120	160	170
CONSTRUCTION:										
TIES/TIMBERS/FORMWORKS	270	290	370		300	230	230	420		270
FRAMING	270	290	370	420	300	230	230		260	270
BEAMS/STRINGERS/EXPOSED POSTS	270	290	370	420	300	230	230	420	260	270
TK PANELLING				420				420		
JOINERY										
SHOP		600	900		4000					
SHOP/CLEAR PULL OUTS						380			400	420
SHOP/CLEAR							550	550		
SHOP/4 CLEAR	550			800						
CLEAR	800	880	1100	1300	5000		550	800		
COMPONENTS/TK							470	600		
DOOR & WINDOW COMPONENTS	1200	1300		1500				600		
OTHER PRODUCTS										
FINGER JOINTED ECONOMY	270	290				230				260
FINGER JOINTED UTILITY	270	290				230				260
PRESSURE TREATED	360	380				310			340	350
LAMINATED STOCK	370	390				320			350	360
MSR	330	350				300			320	330

PROPOSED IMPROVEMENTS IN COASTAL HEMLOCK

The spread sheet which follows is for Coastal Hemlock. There is a similar spread sheet for each species. The information presented on these spread sheets:

- shows improvement in log recoveries which can be achieved both without capital and with capital expenditures;

  The net log cost to the primary mill manufacturing process is obtained by dividing the log cost ($\$/m^3$) by the recovery;

- The grade recovery improvements result from improved operator training and tighter management control. Further grade improvements will result from changed cutting policies and improved recovery of high grade material in the remanufacturing process. This will require additional capital expenditures;

- Product distribution will also improve revenues by adding value (and costs) in remanufacturing process. It is difficult to define exactly where these last two improvements occur when an analysis is made of a site specific case.

These tables are derived to illustrate the potential improvements available to the industry as a whole and should be viewed in this light.

Table 29

Tables of Cost and Revenue Improvements For Coastal Hemlock

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR COASTAL HEMLOCK

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$247.00	$226.00	$197.00	($50.00)
GRADE RECOVERY VALUE	343.80	364.20	372.60	28.80
PRODUCT DISTRIBUTION VALUE	343.80	556.45	562.70	218.90
INCREMENTAL IMPROVEMENT		$233.65	$35.25	$268.90

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 1,960.1

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	484,145	442,983	386,140	(98,005)
GRADE RECOVERY VALUE	673,882	713,868	730,333	56,451
PRODUCT DISTRIBUTION VALUE	673,882	1,090,698	1,102,948	429,066
INCREMENTAL IMPROVEMENT		$457,977	$69,094	$527,071

PROPOSED IMPROVEMENTS FOR COASTAL HEMLOCK

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	45%	49%	56%	
RECOVERY (fbm/M3 NOMINAL)	219.00	238.00	271.00	
RECOVERY (fbm/M3 NET)	192.00	209.00	238.00	
LOG COSTS ($/M3)	$50.00	$50.00	$50.00	
NET LOG COSTS ($/MFBM)	$247.00	$226.00	$197.00	
INCREMENTAL IMPROVEMENT		($21.00)	($29.00)	($50.00)

2) GRADE RECOVERY

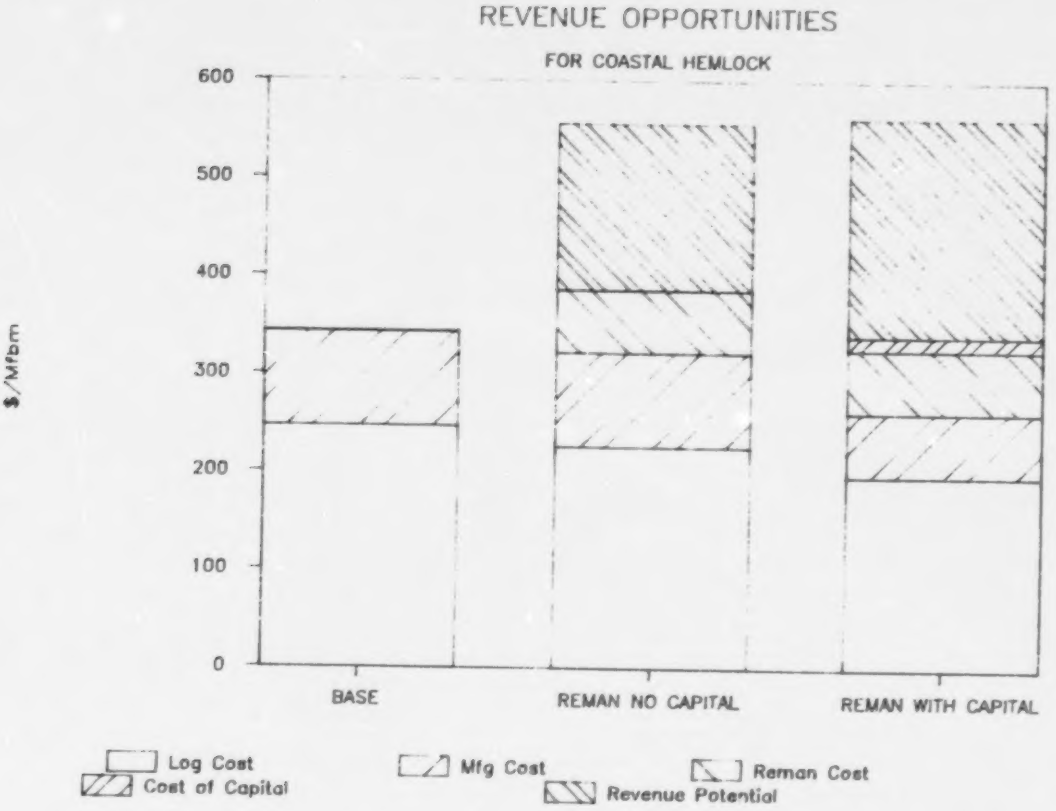
	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	5	5	5	60
UTILITY	10	9	9	160
CONSTRUCTION	59	54	51	270
SHOP / 4 CLEAR'	17	22	25	550
CLEAR	9	10	10	800
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$343.80	$364.20	$372.60	
INCREMENTAL IMPROVEMENT		$20.40	$8.40	$28.80

3) PRODUCT DISTRIBUTION

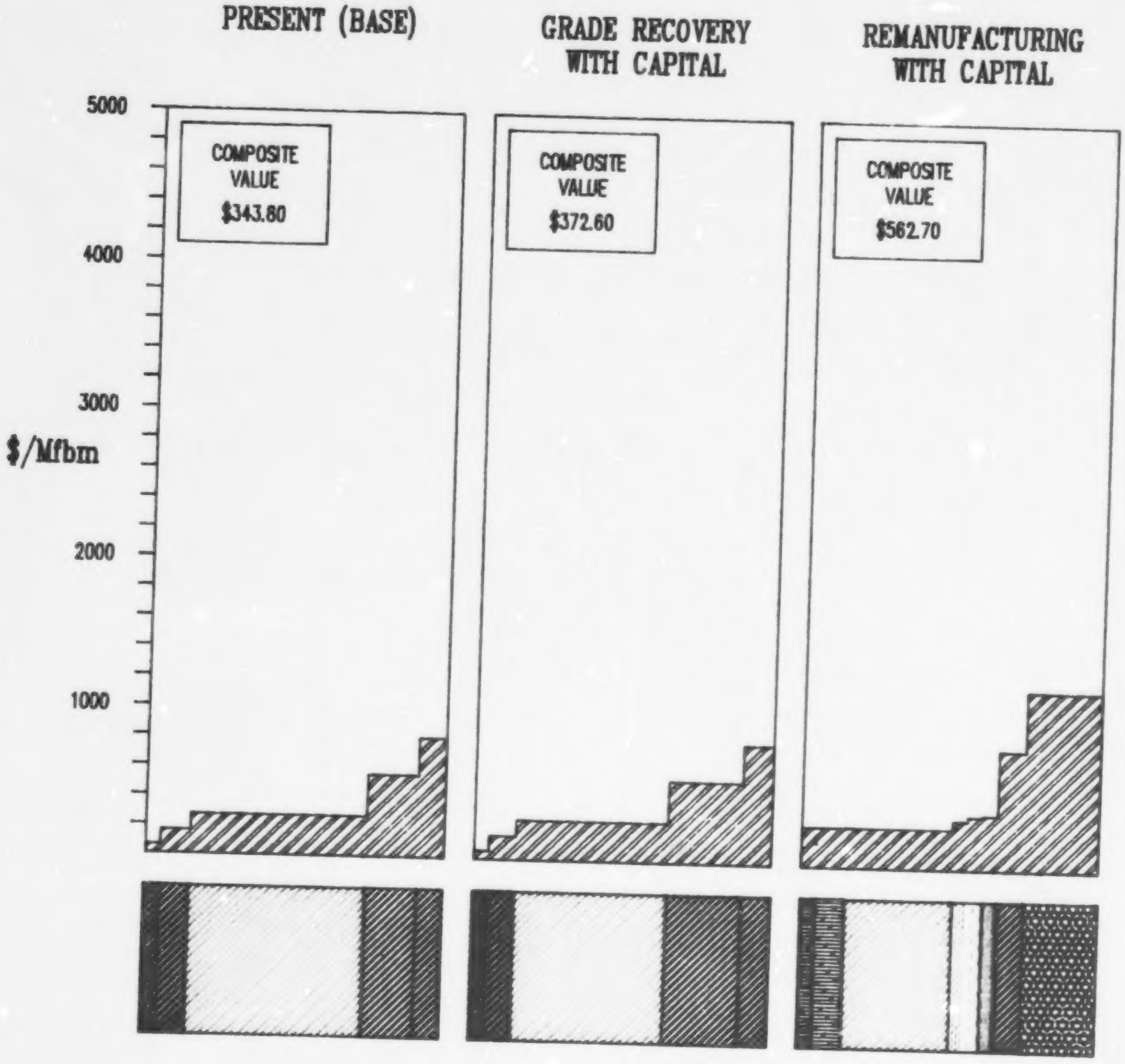
	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY	5			60
UTILITY	10			160
CONSTRUCTION:				
TIES/TIMBERS/FORMWORKS	5	2.5		270
FRAMING	49	46	36	270
BEAMS/STRINGERS/EXPOSED POSTS	5	2.5		270
JOINERY:				
SHOP/4 CLEAR	17			550
CLEAR	9	9	9	800
COMPONENTS		25	25	1,200
OTHER PRODUCTS:				
FINGER JOINT (From economy)		2.5	5	270
FINGER JOINT (From utility)		5	10	270
PRESSURE TREATED		2.5	5	360
LAMINATED STOCK		2.5	5	370
MSR		2.5	5	330
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$343.80	$556.45	$562.70	
INCREMENTAL IMPROVEMENT		$212.65	$6.25	$218.90
GROSS IMPROVEMENT (of 1 & 3)				$268.90

PROVINCIAL PRODUCT DISTRIBUTION FOR COASTAL HEMLOCK

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	98.0		
UTILITY	196.0		
CONSTRUCTION:			
TIES/TIMBERS/FORMWORKS	98.0	49.0	
FRAMING	960.4	901.6	705.6
BEAMS/STRINGERS/EXPOSED POSTS	98.0	49.0	
JOINERY:			
SHOP/4 CLEAR	333.2		
CLEAR	176.4	176.4	176.4
COMPONENTS		490.0	490.0
OTHER PRODUCTS:			
FINGER JOINT (From economy)		49.0	98.0
FINGER JOINT (From utility)		98.0	196.0
PRESSURE TREATED		49.0	98.0
LAMINATED STOCK		49.0	98.0
MSR		49.0	98.0
	1,960.1	1,960.1	1,960.1


REVENUE OPPORTUNITIES
FOR COASTAL HEMLOCK
$/Mfbm
600
500
400
300
200
100
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Cost of Capital
Mfg Cost
Reman Cost
Revenue Potential

PROPOSED IMPROVEMENTS FOR COASTAL HEMLOCK



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	60.00	5	5	0	FINGER JOINT ▤	5	270.00
■ UTILITY GRADE	160.00	10	9	0	FINGER JOINT ▤	10	270.00
▨ CONSTRUCTION GRADE	270.00	59	51	36	MSR ░ PRESSURE TREATED ░	5 5	330.00 360.00
▨ SHOP GRADE	550.00	17	25	0	LAMINATED STOCK ▨	5	370.00
■ CLEAR GRADE	800.00	9	10	9	COMPONENTS ▦	25	1200.00

Table 30

Tables of Cost and Revenue Improvements For Douglas Fir

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR COASTAL DOUGLAS FIR

IMPROVEMENT AREA	$/Mfbm PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$260.00	$237.00	$214.00	($46.00)
GRADE RECOVERY VALUE	357.90	375.70	386.70	28.80
PRODUCT DISTRIBUTION VALUE	357.90	456.40	563.50	205.60
INCREMENTAL IMPROVEMENT		$121.50	$130.10	$251.60

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 559.4

IMPROVEMENT AREA	$ (Thousands) PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	145,444	132,578	119,712	(25,732)
GRADE RECOVERY VALUE	200,209	210,167	216,320	16,111
PRODUCT DISTRIBUTION VALUE	200,209	255,310	315,222	115,013
INCREMENTAL IMPROVEMENT		$67,967	$72,778	$140,745

PROPOSED IMPROVEMENTS FOR COASTAL DOUGLAS FIR

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	49%	53%	58%	
RECOVERY (fbm/M3 NOMINAL)	238.00	257.00	276.00	
RECOVERY (fbm/M3 NET)	208.00	225.00	246.00	
LOG COSTS ($/M3)	$62.00	$62.00	$62.00	
NET LOG COSTS ($/MFBM)	$260.00	$237.00	$214.00	
INCREMENTAL IMPROVEMENT		($23.00)	($23.00)	($46.00)

2) GRADE RECOVERY

-- % GRADE DISTRIBUTION --

GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	5	6	7	80
UTILITY	5	6	8	170
CONSTRUCTION	70	63	55	290
SHOP	12	15	20	600
CLEAR	8	10	10	880
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$357.90	$375.70	$386.70	
INCREMENTAL IMPROVEMENT		$17.80	$11.00	$28.80

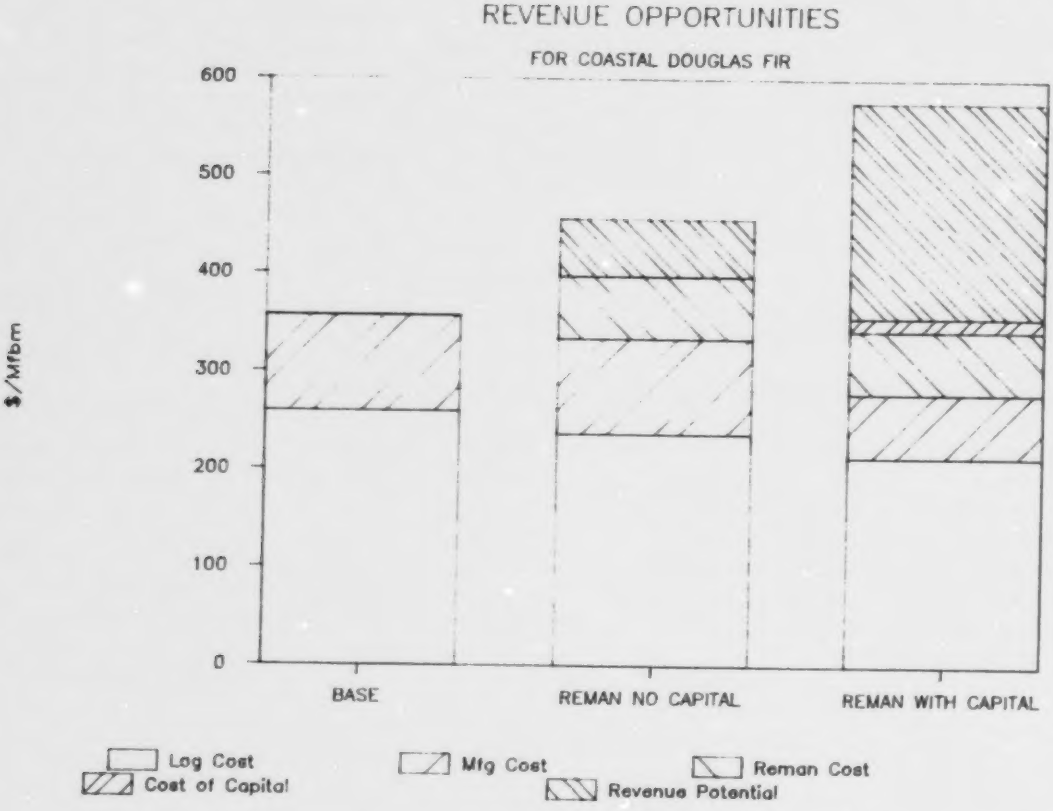
3) PRODUCT DISTRIBUTION

- % PRODUCT DISTRIBUTION -

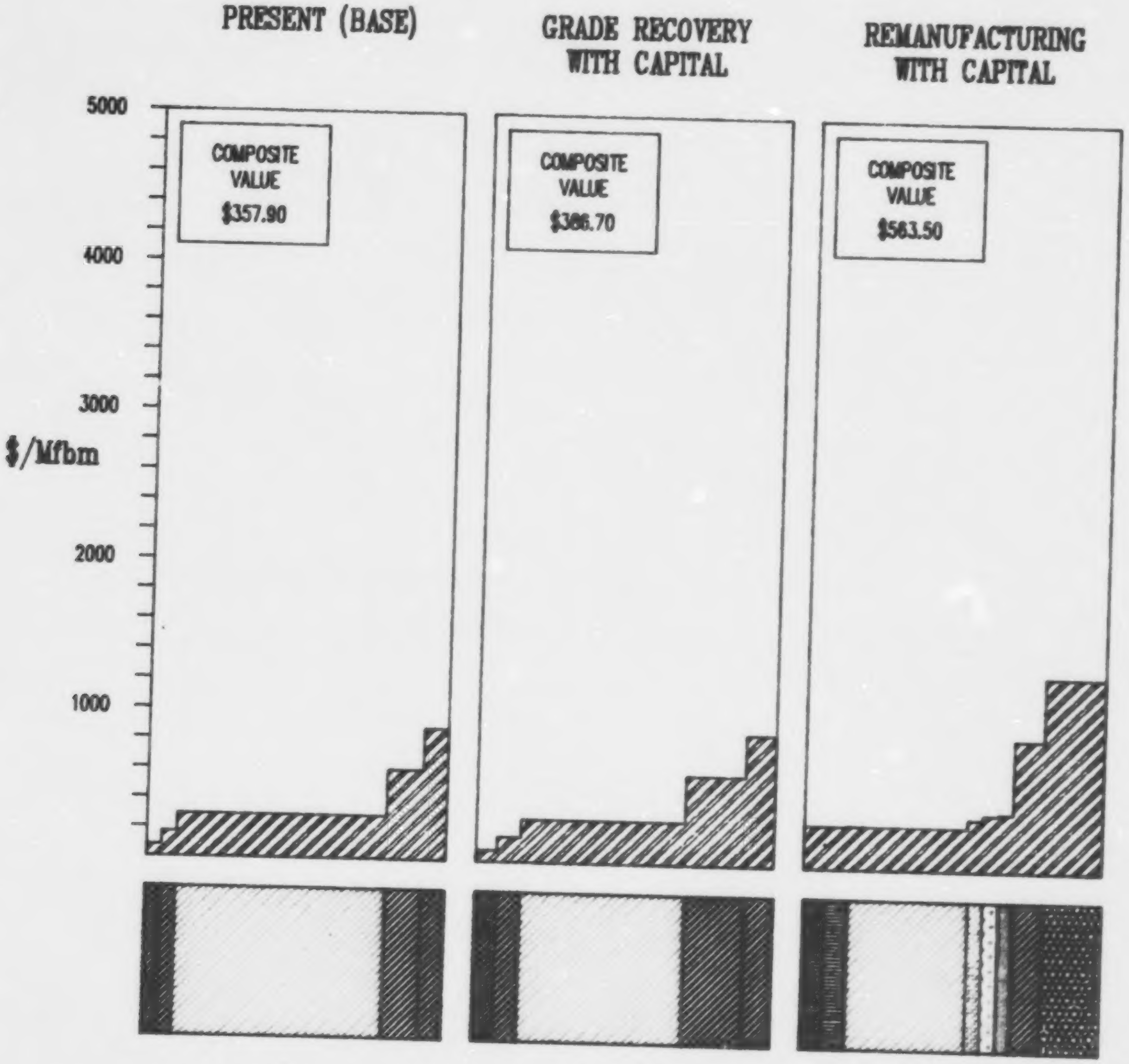
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY	5	2.5		80
UTILITY	5	2.5		170
CONSTRUCTION:				
TIES/TIMBERS/FORMWORKS	10	7.5		290
FRAMING	50	47.5	40	290
BEAMS/STRINGERS/EXPOSED POSTS	10	7.5		290
JOINERY:				
SHOP	12			600
CLEAR	8	8	10	880
COMPONENTS		12	20	1,300
OTHER PRODUCTS:				
FINGER JOINT (From economy)		2.5	7	290
FINGER JOINT (From utility)		2.5	8	290
PRESSURE TREATED		2.5	5	380
LAMINATED STOCK		2.5	5	390
MSR		2.5	5	350
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$357.90	$456.40	$563.50	
INCREMENTAL IMPROVEMENT		$98.50	$107.10	$205.60
GROSS IMPROVEMENT (of 1 & 3)				$251.60

PROVINCIAL PRODUCT DISTRUBUTION FOR COASTAL DOUGLAS FIR

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	28.0	14.0	
UTILITY	28.0	14.0	
CONSTRUCTION:			
TIES/TIMBERS/FORMWORKS	55.9	42.0	
FRAMING	279.7	265.7	223.8
BEAMS/STRINGERS/EXPOSED POSTS	55.9	42.0	
JOINERY:			
SHOP	67.1		
CLEAR	44.8	44.8	55.9
COMPONENTS		67.1	111.9
OTHER PRODUCTS:			
FINGER JOINT (From economy)		14.0	39.2
FINGER JOINT (From utility)		14.0	44.8
PRESSURE TREATED		14.0	28.0
LAMINATED STOCK		14.0	28.0
MSR		14.0	28.0
	559.4	559.4	559.4


REVENUE OPPORTUNITIES
FOR COASTAL DOUGLAS FIR
$/Mfbm
600
500
400
300
200
100
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential

PROPOSED IMPROVEMENTS FOR COASTAL DOUGLAS FIR



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
■ ECONOMY GRADE	80.00	5	7	0	FINGER JOINT ■	7	290.00
■ UTILITY GRADE	170.00	5	8	0	FINGER JOINT ■	8	280.00
▨ CONSTRUCTION GRADE	290.00	70	55	40	MSR ▨	5	350.00
▨ SHOP GRADE	600.00	12	20	0	PRESSURE TREATED ▨	5	380.00
■ CLEAR GRADE	880.00	8	10	10	LAMINATED STOCK ▨	5	390.00
					COMPONENTS ▨	20	1300.00

Table 31

Tables of Cost and Revenue Improvements For Sitka Spruce

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR SITKA SPRUCE

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$415.00	$376.00	$347.00	($68.00)
GRADE RECOVERY VALUE	516.00	542.50	605.50	89.50
PRODUCT DISTRIBUTION VALUE				
INCREMENTAL IMPROVEMENT		$65.50	$92.00	$157.50

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 125.3

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	52,000	47,113	43,479	(8,520)
GRADE RECOVERY VALUE	64,655	67,975	75,869	11,214
PRODUCT DISTRIBUTION VALUE				
INCREMENTAL IMPROVEMENT		$8,207	$11,528	$19,735

PROPOSED IMPROVEMENTS FOR SITKA SPRUCE

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	47%	51%	55%	
RECOVERY (fbm/M3 NOMINAL)	228.60	218.00	234.00	
RECOVERY (fbm/M3 NET)	200.00	218.00	234.00	
LOG COSTS ($/M3)	$93.00	$93.00	$93.00	
NET LOG COSTS ($/MFBM)	$415.00	$376.00	$347.00	
INCREMENTAL IMPROVEMENT		($39.00)	($29.00)	($68.00)

2) GRADE RECOVERY

	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	5	5	5	90
UTILITY	10	10	10	180
CONSTRUCTION	55	50	40	370
SHOP	20	25	30	900
CLEAR	10	10	15	1,100
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$516.00	$542.50	$605.50	
INCREMENTAL IMPROVEMENT		$26.50	$63.00	$89.50

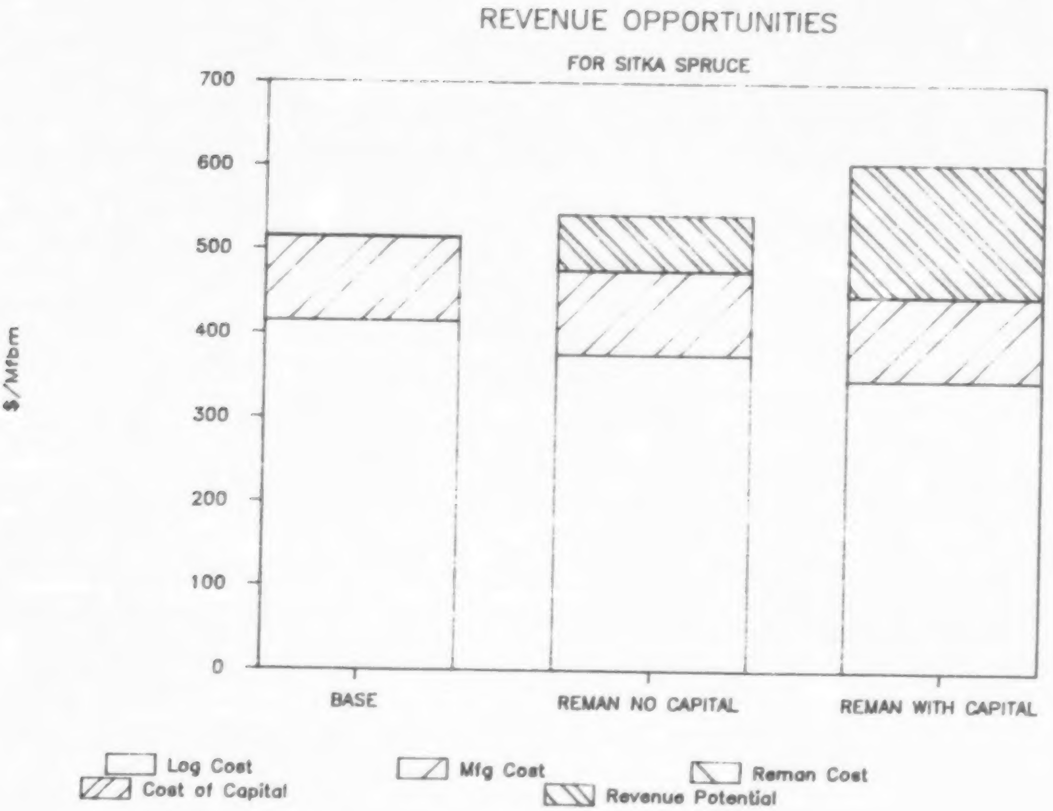
3) PRODUCT DISTRIBUTION

	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY				90
UTILITY				180
CONSTRUCTION:				
TIES/TIMBERS/FORMWORKS				370
FRAMING				370
BEAMS/STRINGERS/EXPOSED POSTS				370
JOINERY:				
SHOP				900
CLEAR				1,100
COMPONENTS				
OTHER PRODUCTS:				
FINGER JOINT (From economy)				
FINGER JOINT (From utility)				
PRESSURE TREATED				
LAMINATED STOCK				
MSR				
COMPOSITE VALUE ($/MFBM)				
INCREMENTAL IMPROVEMENT				

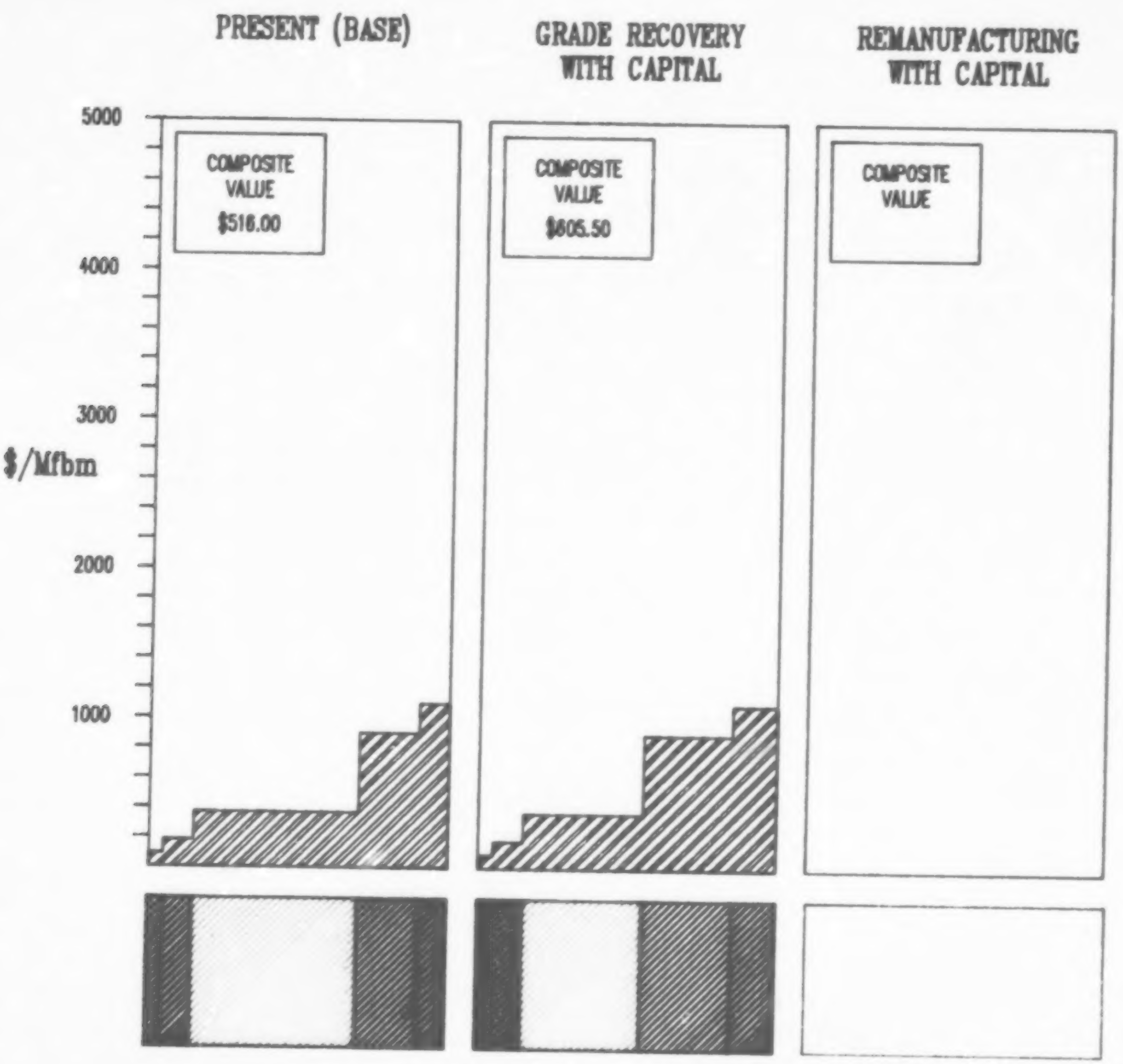
GROSS IMPROVEMENT (of 1 & 3) $157.50

PROVINCIAL PRODUCT DISTRIBUTION FOR SITKA SPRUCE

PRODUCT	MMfbm / year PRESENT (BASE)	- REMANUFACTURING - NO CAPITAL	 WITH CAPITAL
EXPENDABLE:			
ECONOMY	6.3	6.3	6.3
UTILITY	12.5	12.5	12.5
CONSTRUCTION:			
TIES/TIMBERS/FORMWORKS			
FRAMING	68.9	62.7	50.1
BEAMS/STRINGERS/EXPOSED POSTS			
JOINERY:			
SHOP	25.1	31.3	37.6
CLEAR	12.5	12.5	18.8
COMPONENTS			
OTHER PRODUCTS:			
FINGER JOINT (From economy)			
FINGER JOINT (From utility)			
PRESSURE TREATED			
LAMINATED STOCK			
MSR			
	125.3	125.3	125.3


REVENUE OPPORTUNITIES
FOR SITKA SPRUCE
$/Mfbm
700
600
500
400
300
200
100
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential

PROPOSED IMPROVEMENTS FOR SITKA SPRUCE



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	90.00	5	5		▨ FINGER JOINT		
■ UTILITY GRADE	180.00	10	10		■ FINGER JOINT		
░ CONSTRUCTION GRADE	370.00	55	40		░ MSR PRESSURE TREATED LAMINATED STOCK		
▨ SHOP GRADE	900.00	20	30		▨ COMPONENTS		
■ CLEAR GRADE	1100.00	10	15		■ COMPONENTS		

Table 32

Tables of Cost and Revenue Improvements For Western Red Cedar

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR WESTERN RED CEDAR

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$371.58	$338.48	$313.36	($58.22)
GRADE RECOVERY VALUE	560.00	567.60	579.00	19.00
PRODUCT DISTRIBUTION VALUE	560.00	700.00	754.00	194.00
INCREMENTAL IMPROVEMENT		$173.11	$79.11	$252.22

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 926.0

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	344,087	313,430	290,175	(53,912)
GRADE RECOVERY VALUE	518,560	525,598	536,154	17,594
PRODUCT DISTRIBUTION VALUE	518,560	648,200	698,204	179,644
INCREMENTAL IMPROVEMENT		$160,298	$73,258	$233,556

PROPOSED IMPROVEMENTS FOR WESTERN RED CEDAR

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	43%	47%	51%	
RECOVERY (fbm/M3 NOMINAL)	209.00	229.00	247.00	
RECOVERY (fbm/M3 NET)	183.00	200.90	217.00	
LOG COSTS ($/M3)	$68.00	$68.00	$68.00	
NET LOG COSTS ($/MFBM)	$371.58	$338.48	$313.36	
INCREMENTAL IMPROVEMENT		($33.11)	($25.11)	($58.22)

2) GRADE RECOVERY

	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	10	10	10	40
UTILITY	10	10	10	120
STRUCTURAL/STK	45	43	40	420
SHOP/4 CLEAR	20	22	25	800
CLEAR	15	15	15	1,300
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$560.00	$567.60	$579.00	
INCREMENTAL IMPROVEMENT		$7.60	$11.40	$19.00

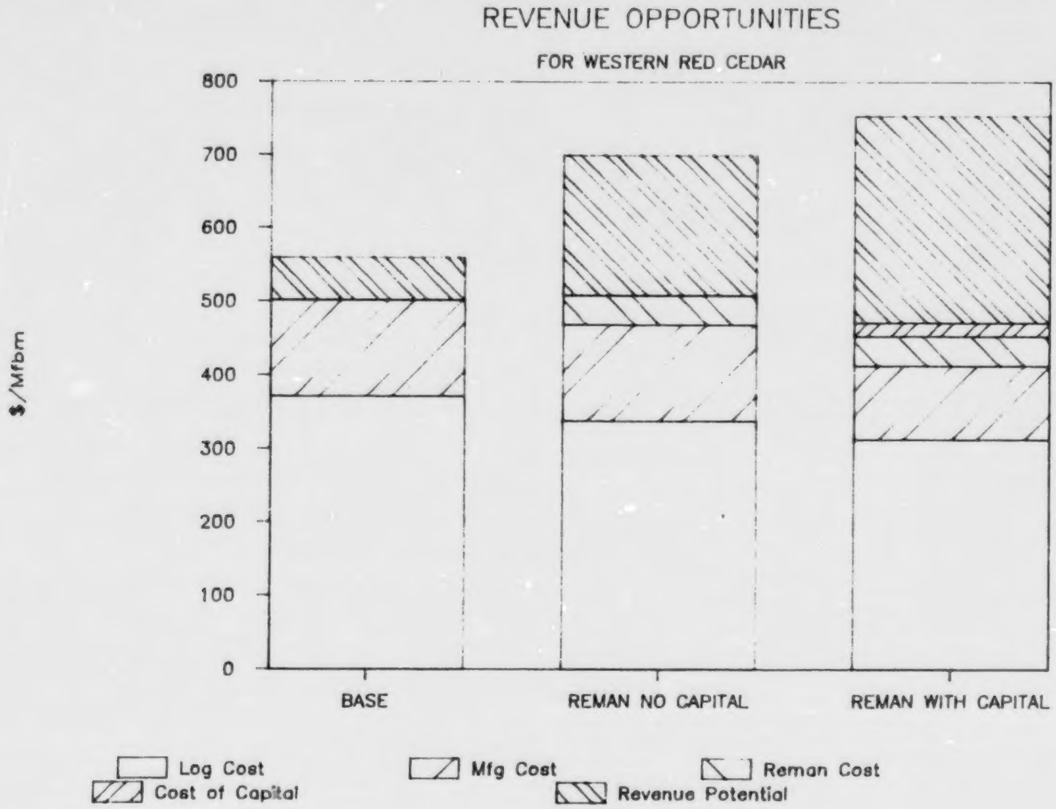
3) PRODUCT DISTRIBUTION

	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY	10	10	10	40
UTILITY	10	10	10	120
CONSTRUCTION:				
TK PANEL	25	25	25	420
FRAMING	15	15	10	420
BEAMS/STRINGERS/EXPOSED POSTS	5	5	5	420
JOINERY:				
SHOP/4 CLEAR	20			800
CLEAR	15	15	15	1,300
COMPONENTS		20	25	1,500
OTHER PRODUCTS:				
FINGER JOINT (From economy)				
FINGER JOINT (From utility)				
LAMINATED STOCK				
MSR				
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$560.00	$700.00	$754.00	
INCREMENTAL IMPROVEMENT		$140.00	$54.00	$194.00

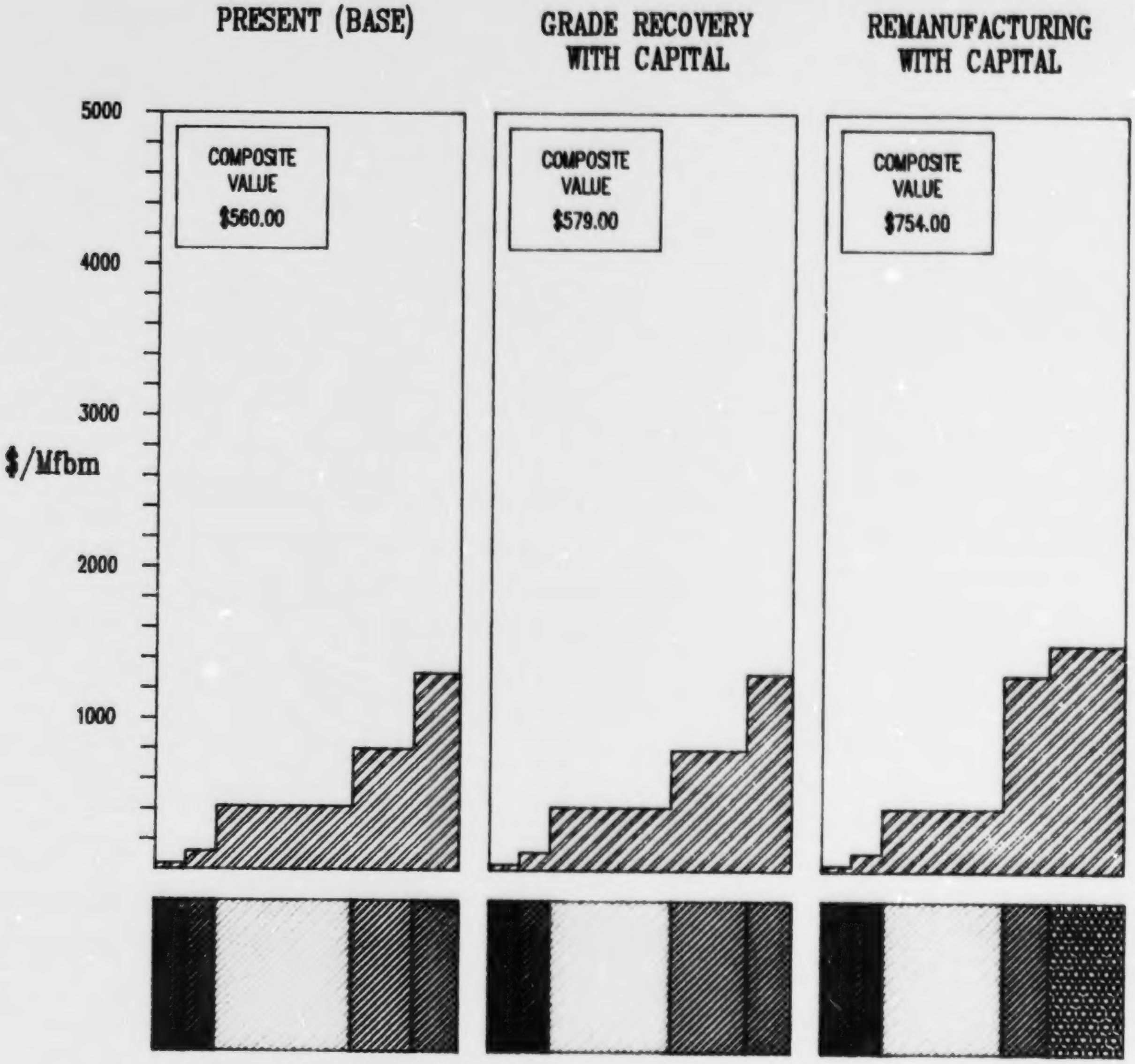
GROSS IMPROVEMENT (of 1 & 3) $252.22

PROVINCIAL PRODUCT DISTRIBUTION FOR WESTERN RED CEDAR

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	92.6	92.6	92.6
UTILITY	92.6	92.6	92.6
CONSTRUCTION:			
TK PANEL	231.5	231.5	231.5
FRAMING	138.9	138.9	92.6
BEAMS/STRINGERS/EXPOSED POSTS	46.3	46.3	46.3
JOINERY:			
SHOP/4 CLEAR	185.2		
CLEAR	138.9	138.9	138.9
COMPONENTS		185.2	231.5
OTHER PRODUCTS:			
FINGER JOINT (From economy)			
FINGER JOINT (From utility)			
LAMINATED STOCK			
MSR			
	926.0	926.0	926.0


REVENUE OPPORTUNITIES
FOR WESTERN RED CEDAR
$/Mfbm
800
700
600
500
400
300
200
100
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential

PROPOSED IMPROVEMENTS FOR WESTERN RED CEDAR



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.		(%)	REMAN REVENUE ($/Mfbm)
■ ECONOMY GRADE	40.00	10	10	10	■ — FINGER JOINT	▤	0	
■ UTILITY GRADE	120.00	10	10	10	■ — FINGER JOINT	▤	0	
					MSR	☐	0	
░ CONSTRUCTION GRADE	420.00	45	40	40	░ — PRESSURE TREATED	☐	0	
▨ SHOP GRADE	800.00	20	25	0	▨ — LAMINATED STOCK	☐	0	
					COMPONENTS	▩	25	1500.00
▨ CLEAR GRADE	1300.00	15	15	15	▨			

Table 33

Tables of Cost and Revenue Improvements For Yellow Cedar

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR YELLOW CEDAR

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$947.63	$909.96	$811.97	($135.67)
GRADE RECOVERY VALUE	2122.00	2122.00	2542.00	420.00
PRODUCT DISTRIBUTION VALUE				
INCREMENTAL IMPROVEMENT		$37.67	$518.00	$555.67

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 139.1

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	131,815	126,576	112,944	(18,871)
GRADE RECOVERY VALUE	295,170	295,170	353,592	58,422
PRODUCT DISTRIBUTION VALUE				
INCREMENTAL IMPROVEMENT		$5,240	$72,053	$77,293

PROPOSED IMPROVEMENTS FOR YELLOW CEDAR

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	47%	49%	55%	
RECOVERY (fbm/M3 NOMINAL)	228.60	238.10	267.00	
RECOVERY (fbm/M3 NET)	200.50	208.80	234.00	
LOG COSTS ($/M3)	$190.00	$190.00	$190.00	
NET LOG COSTS ($/MFBM)	$947.63	$909.96	$811.97	
INCREMENTAL IMPROVEMENT		($37.67)	($98.00)	($135.67)

2) GRADE RECOVERY

	-- % GRADE DISTRIBUTION --			
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	10	10	10	50
UTILITY	10	10	10	120
CONSTRUCTION	35	35	25	300
SHOP	25	25	30	4,000
CLEAR	20	20	25	5,000
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$2,122.00	$2,122.00	$2,542.00	
INCREMENTAL IMPROVEMENT			$420.00	$420.00

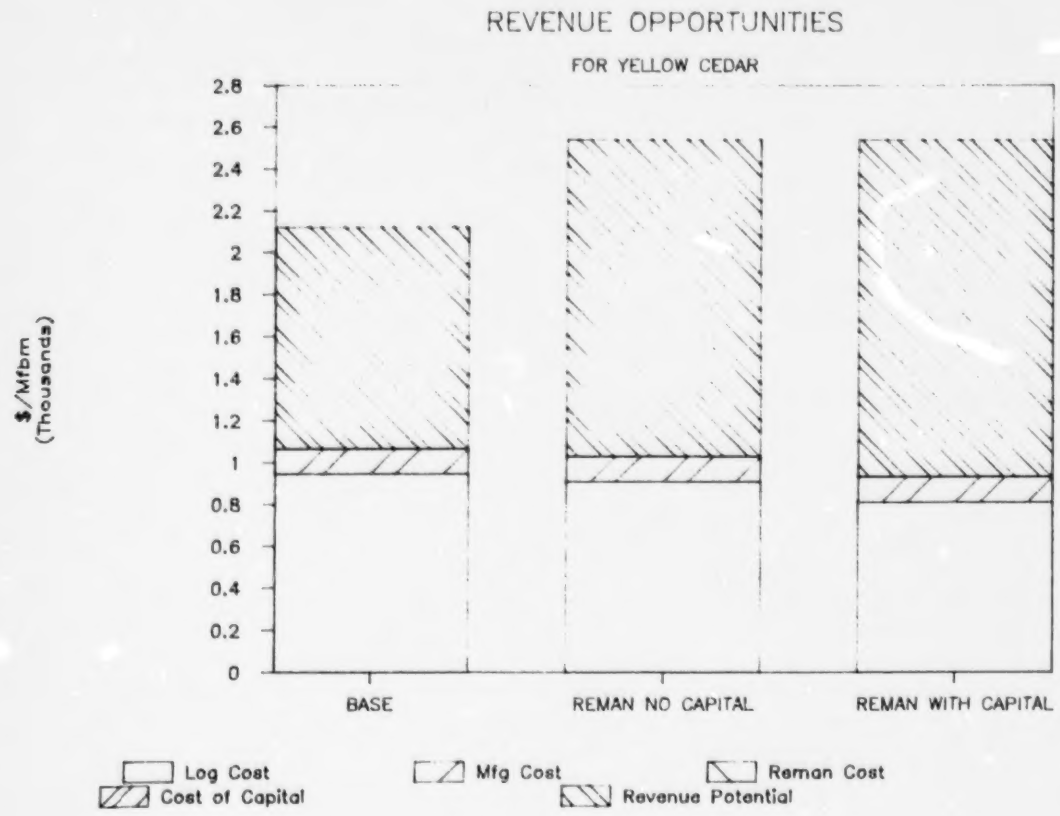
3) PRODUCT DISTRIBUTION

	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY				50
UTILITY				120
CONSTRUCTION:				
TIES/TIMBERS/FORMWORKS				300
FRAMING				300
BEAMS/STRINGERS/EXPOSED POSTS				300
JOINERY:				
SHOP				4,000
CLEAR				5,000
COMPONENTS				
OTHER PRODUCTS:				
FINGER JOINT (From economy)				
FINGER JOINT (From utility)				
LAMINATED STOCK				
MSR				
COMPOSITE VALUE ($/MFBM)				
INCREMENTAL IMPROVEMENT				

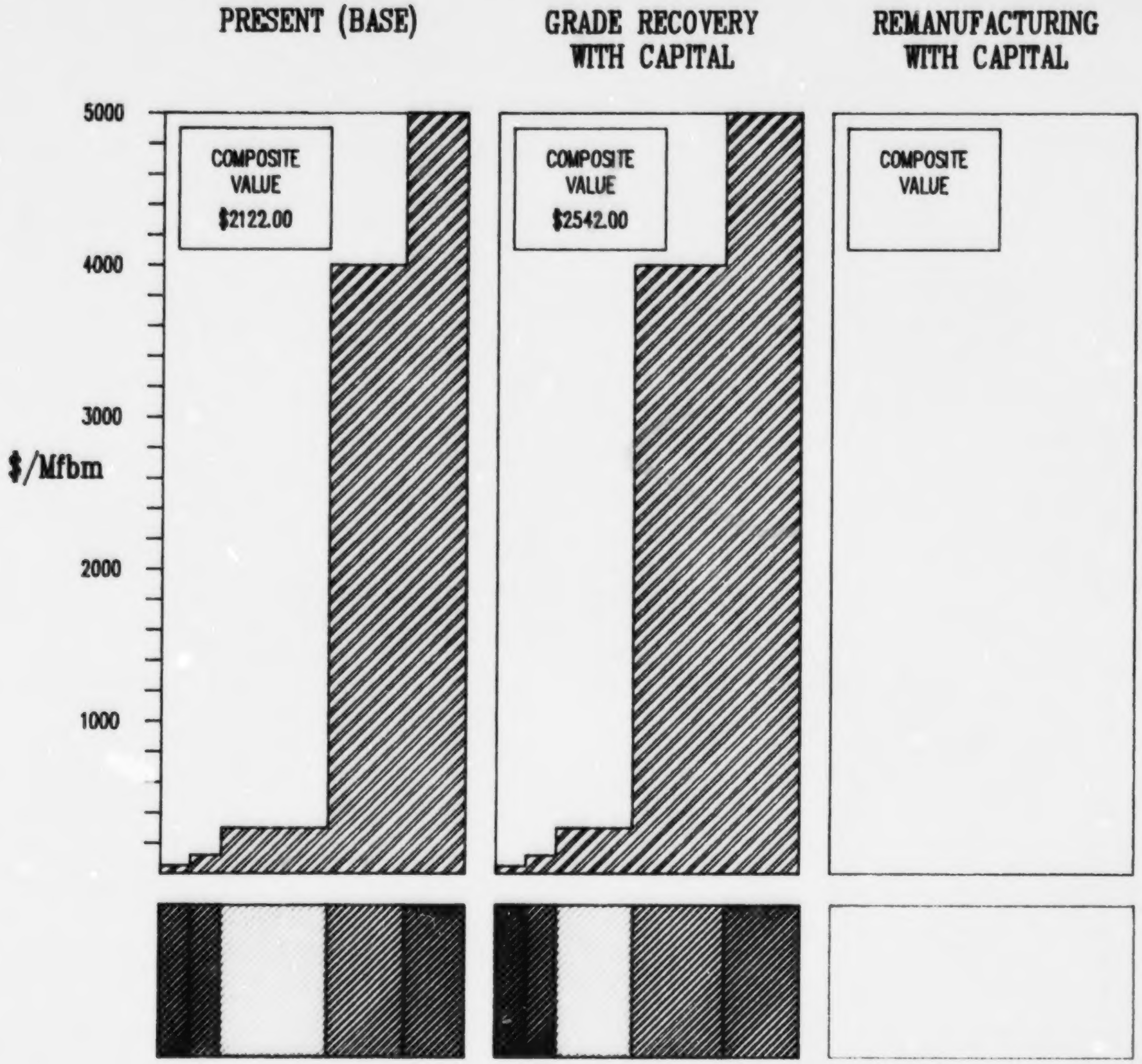
GROSS IMPROVEMENT (of 1 & 3) $555.67

PROVINCIAL PRODUCT DISTRIBUTION FOR YELLOW CEDAR

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	13.9	13.9	13.9
UTILITY	13.9	13.9	13.9
CONSTRUCTION:			
TK PANEL			
FRAMING	48.7	48.7	34.8
BEAMS/STRINGERS/EXPOSED POSTS			
JOINERY:			
SHOP	34.8	34.8	41.7
CLEAR	27.8	27.8	34.8
COMPONENTS			
OTHER PRODUCTS:			
FINGER JOINT (From economy)			
FINGER JOINT (From utility)			
LAMINATED STOCK			
MSR			
	139.1	139.1	139.1


REVENUE OPPORTUNITIES
FOR YELLOW CEDAR
$/Mfbm (Thousands)
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential

PROPOSED IMPROVEMENTS FOR YELLOW CEDAR



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	50.00	10	10		▨ FINGER JOINT		
■ UTILITY GRADE	120.00	10	10		■ FINGER JOINT MSR		
□ CONSTRUCTION GRADE	300.00	35	25		□ PRESSURE TREATED		
▨ SHOP GRADE	4000.00	25	30		▨ LAMINATED STOCK		
▨ CLEAR GRADE	5000.00	20	25		▨ COMPONENTS		

Table 34

Tables of Cost and Revenue Improvements For Spruce/Pine/Fir

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR SPRUCE/PINE/FIR

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$139.04	$127.45	$110.64	($28.40)
GRADE RECOVERY VALUE	213.00	215.60	218.20	5.20
PRODUCT DISTRIBUTION VALUE	213.00	248.50	260.00	47.00
INCREMENTAL IMPROVEMENT		$47.09	$28.31	$75.40

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 8,272.3

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	1,150,159	1,054,313	915,233	(234,926)
GRADE RECOVERY VALUE	1,762,000	1,783,508	1,805,016	43,016
PRODUCT DISTRIBUTION VALUE	1,762,000	2,055,667	2,150,798	388,798
INCREMENTAL IMPROVEMENT		$389,513	$234,211	$623,724

PROPOSED IMPROVEMENTS FOR SPRUCE/PINE/FIR

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	44%	48%	55%	
RECOVERY (fbm/M3 NOMINAL)	222.00	243.00	280.00	
RECOVERY (fbm/M3 NET)	187.00	204.00	235.00	
LOG COSTS ($/M3)	$26.00	$26.00	$26.00	
NET LOG COSTS ($/MFBM)	$139.04	$127.45	$110.64	
INCREMENTAL IMPROVEMENT		($11.59)	($16.81)	($28.40)

2) GRADE RECOVERY

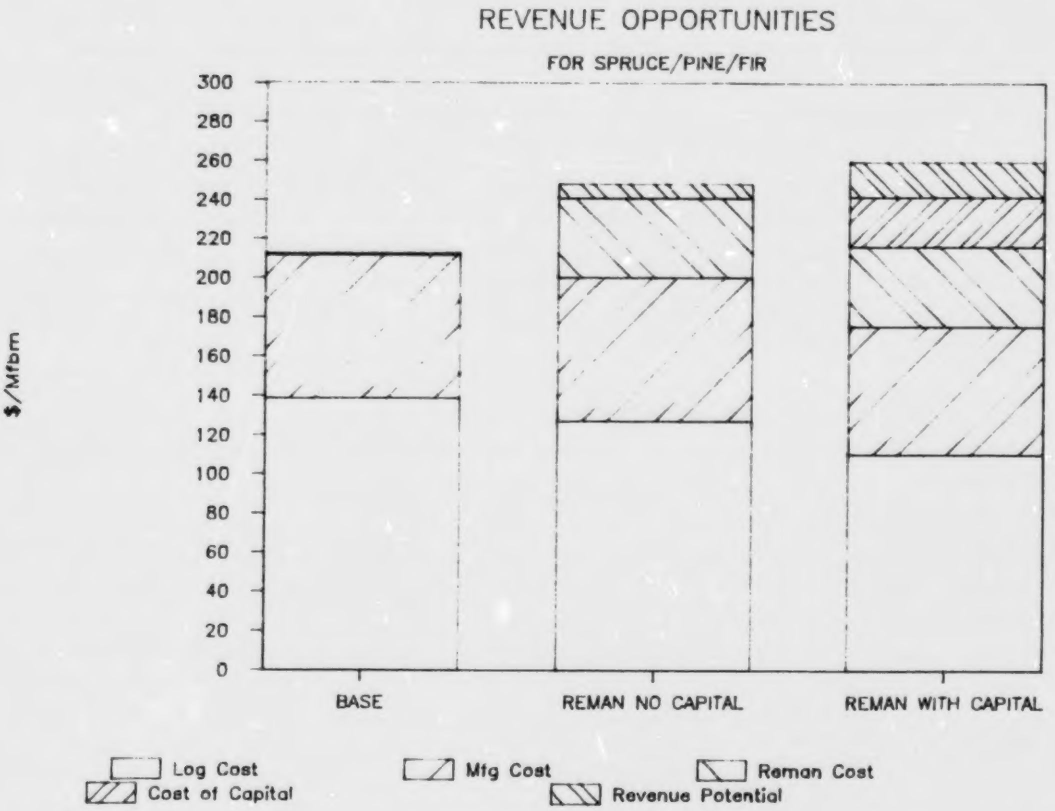
	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	5	5	5	$50
UTILITY	10	9	8	$120
CONSTRUCTION	83	83	83	$230
SHOP/CLEAR PULL OUTS	2	3	4	$380
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$213.00	$215.60	$218.20	
INCREMENTAL IMPROVEMENT		$2.60	$2.60	$5.20

3) PRODUCT DISTRIBUTION

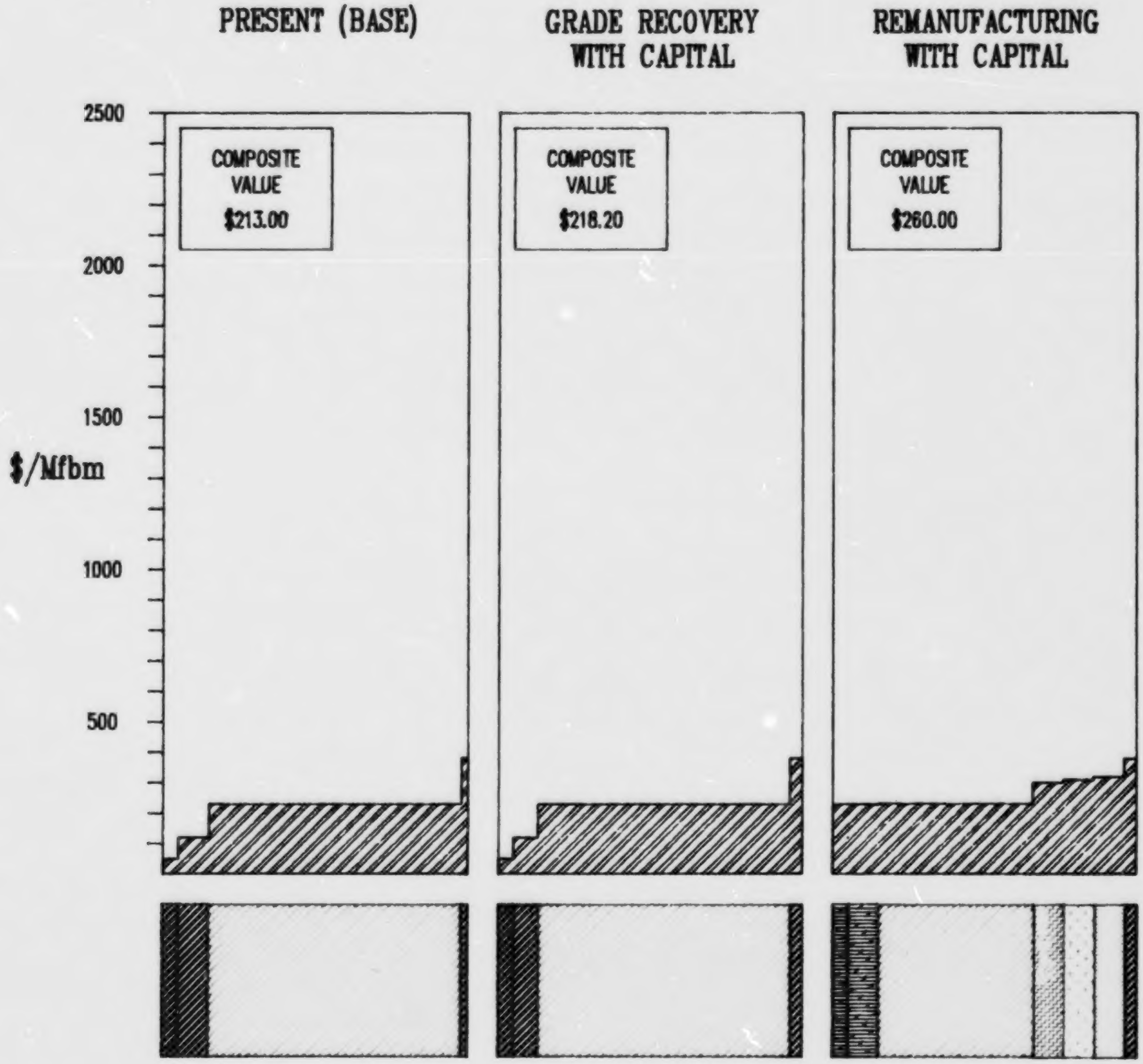
	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY	5			50
UTILITY	10			120
CONSTRUCTION:				
TIES/TIMBERS/FORMWORKS	5	5	10	230
FRAMING	78	58	41	230
BEAMS/STRINGERS/EXPOSED POSTS				230
JOINERY:				
SHOP/CLEAR PULL OUTS	2	2	4	380
COMPONENTS				
OTHER PRODUCTS:				
FINGER JOINT (From economy)		5	5	230
FINGER JOINT (From utility)		10	10	230
PRESSURE TREATED		5	10	310
LAMINATED STOCK		5	10	320
MSR		10	10	300
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$213.00	$248.50	$260.00	
INCREMENTAL IMPROVEMENT		$35.50	$11.50	$47.00
GROSS IMPROVEMENT (of 1 & 3)				$75.40

PROVINCIAL PRODUCT DISTRIBUTION FOR SPRUCE/PINE/FIR

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	413.6		
UTILITY	827.2		
CONSTRUCTION:			
TIES/TIMBERS/FORMWORKS	413.6	413.6	827.2
FRAMING	6,452.4	4,797.9	3,391.6
BEAMS/STRINGERS/EXPOSED POSTS			
JOINERY:			
SHOP/CLEAR PULL OUTS	165.4	165.4	330.9
COMPONENTS			
OTHER PRODUCTS:			
FINGER JOINT (From economy)		413.6	413.6
FINGER JOINT (From utility)		827.2	827.2
PRESSURE TREATED		413.6	827.2
LAMINATED STOCK		413.6	827.2
MSR		827.2	827.2
	8,272.3	8,272.3	8,272.3


REVENUE OPPORTUNITIES
FOR SPRUCE/PINE/FIR
$/Mfbm
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential

PROPOSED IMPROVEMENTS FOR SPRUCE/PINE/FIR



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.		(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	50.00	5	5		▨	FINGER JOINT ▤	5	230.00
▨ UTILITY GRADE	120.00	10	8		▨	FINGER JOINT ▤	10	230.00
						MSR ░	10	300.00
░ CONSTRUCTION GRADE	230.00	83	83	51	░	PRESSURE TREATED ░	10	310.00
▨					▨	LAMINATED STOCK □	10	320.00
						COMPONENTS ▩		
▨ SHOP/CLEAR	380.00	2	4	4	▨			

Table 35

Tables of Cost and Revenue Improvements For Lodgepole Pine

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR LODGEPOLE PINE

$/Mfbm

IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$142.86	$128.71	$112.55	($30.30)
GRADE RECOVERY VALUE	201.00	204.20	207.40	6.40
PRODUCT DISTRIBUTION VALUE	201.00	321.00	345.00	144.00
INCREMENTAL IMPROVEMENT		$134.14	$40.16	$174.30

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 300.0

$ (Thousands)

IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	42,857	38,614	33,766	(9,091)
GRADE RECOVERY VALUE	60,300	61,260	62,220	1,920
PRODUCT DISTRIBUTION VALUE	60,300	96,300	103,500	43,200
INCREMENTAL IMPROVEMENT		$40,243	$12,048	$52,291

PROPOSED IMPROVEMENTS FOR LODGEPOLE PINE

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	43%	48%	55%	
RECOVERY (fbm/M3 NOMINAL)	216.00	240.00	275.00	
RECOVERY (fbm/M3 NET)	182.00	202.00	231.00	
LOG COSTS ($/M3)	$26.00	$26.00	$26.00	
NET LOG COSTS ($/MFBM)	$142.86	$128.71	$112.55	
INCREMENTAL IMPROVEMENT		($14.14)	($16.16)	($30.30)

2) GRADE RECOVERY

	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	10	10	10	$50
UTILITY	10	10	10	$120
CONSTRUCTION	80	79	78	$230
SHOP/CLEAR		1	2	$550
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$201.00	$204.20	$207.40	
INCREMENTAL IMPROVEMENT		$3.20	$3.20	$6.40

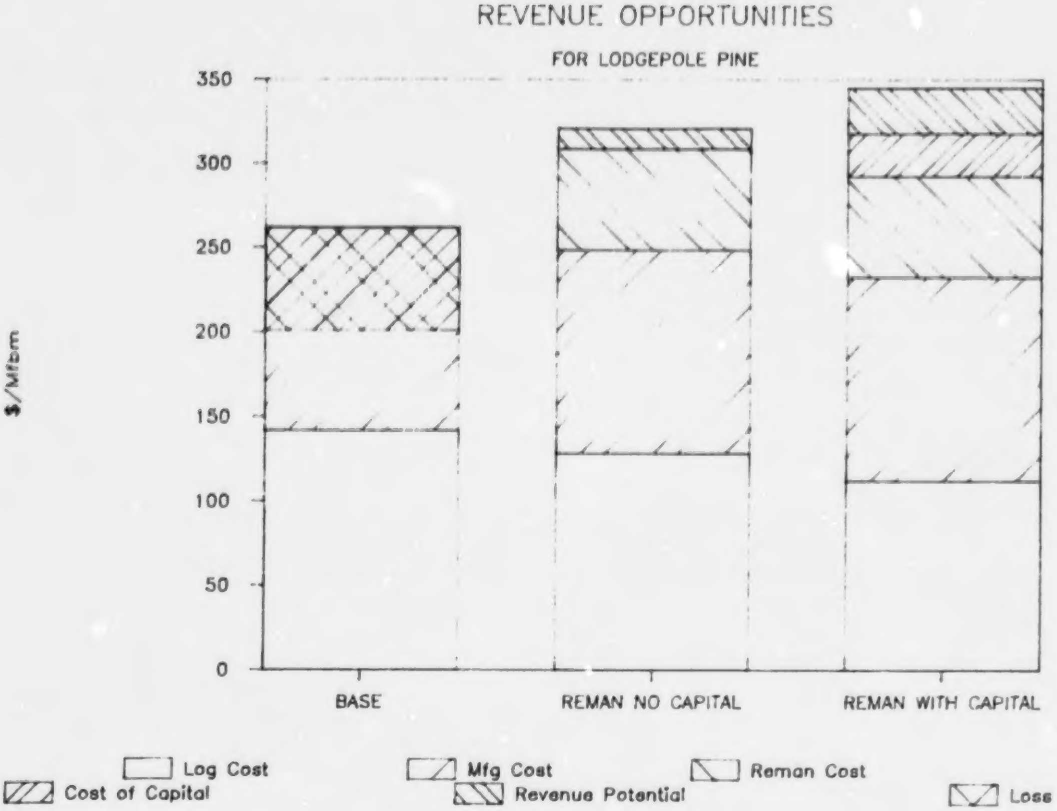
3) PRODUCT DISTRIBUTION

	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY	10	10	10	50
UTILITY	10	10	10	120
CONSTRUCTION:				
TIES/TIMBERS/FORMWORKS				230
FRAMING	80	30	20	230
BEAMS/STRINGERS/EXPOSED POSTS				230
JOINERY:				
SHOP/CLEAR				550
CLEAR				550
COMPONENTS (TK)		50	60	470
OTHER PRODUCTS:				
FINGER JOINT (From economy)				
FINGER JOINT (From utility)				
PRESSURE TREATED				
LAMINATED STOCK				
MSR				
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$201.00	$321.00	$345.00	
INCREMENTAL IMPROVEMENT		$120.00	$24.00	$144.00

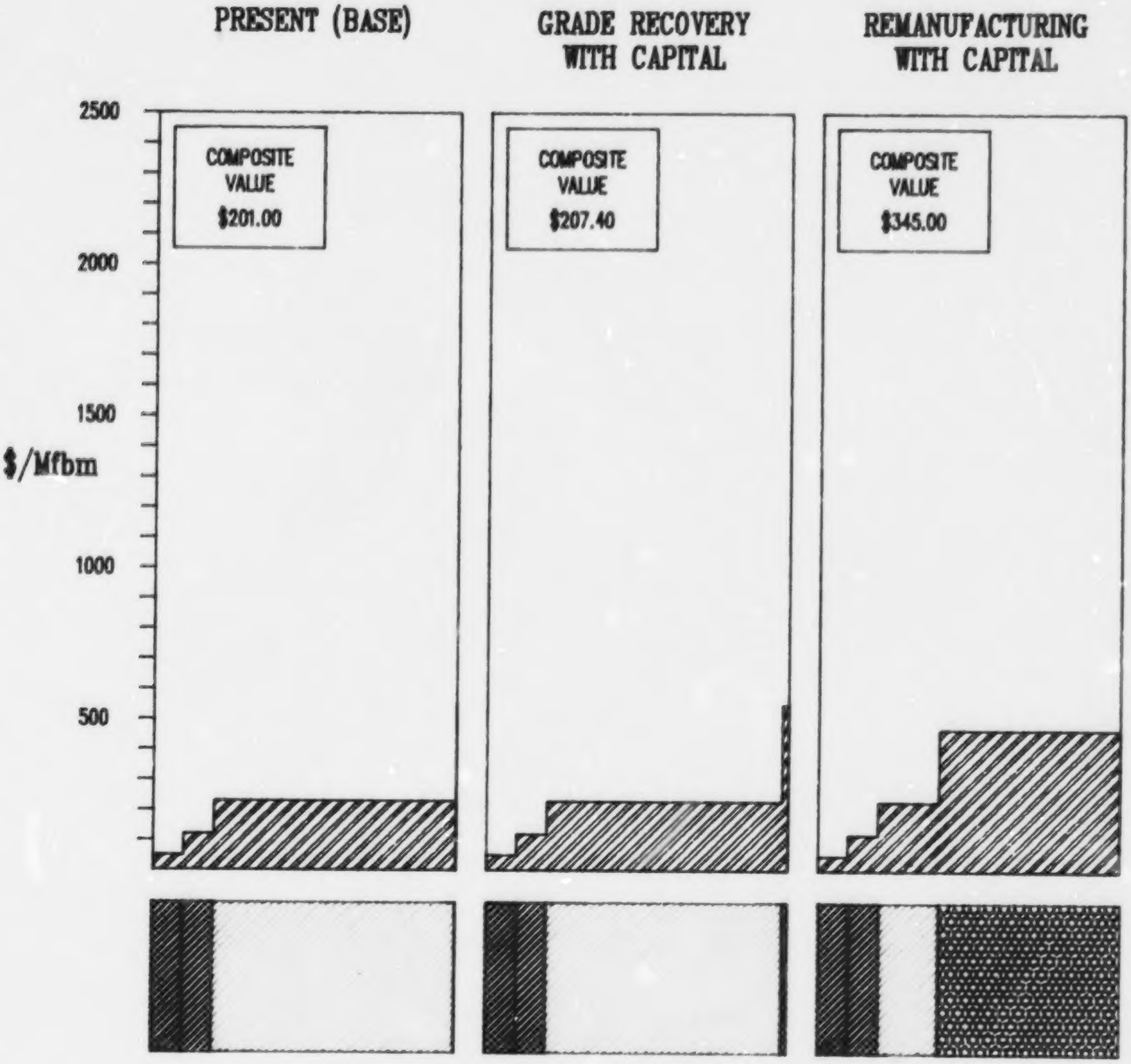
GROSS IMPROVEMENT (of 1 & 3) $174.30

PROVINCIAL PRODUCT DISTRIBUTION FOR LODGEPOLE PINE

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	30.0	30.0	30.0
UTILITY	30.0	30.0	30.0
CONSTRUCTION:			
TIES/TIMBERS/FORMWORKS			
FRAMING	240.0	90.0	60.0
BEAMS/STRINGERS/EXPOSED POSTS			
JOINERY:			
SHOP/CLEAR			
CLEAR			
FURNITURE COMPONENTS (TK)		150.0	180.0
OTHER PRODUCTS:			
FINGER JOINT (From economy)			
FINGER JOINT (From utility)			
PRESSURE TREATED			
LAMINATED STOCK			
MSR			
	300.0	300.0	300.0


REVENUE OPPORTUNITIES
FOR LODGEPOLE PINE
$/Mfbm
350
300
250
200
150
100
50
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential
Loss

PROPOSED IMPROVEMENTS FOR LODGEPOLE PINE



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	50.00	10	10	10	▨ — FINGER JOINT ▤		
▩ UTILITY GRADE	120.00	10	10	10	▩ — FINGER JOINT ▤		
░ CONSTRUCTION GRADE	230.00	80	78	20	░ — MSR ░ PRESSURE TREATED ░		
▨					▨ — LAMINATED STOCK □		
					▨ — COMPONENTS ▦	60	470.00
▩ SHOP/CLEAR GRADE	550.00	0	2				

Table 36

Tables of Cost and Revenue Improvements

For Interior Cedar

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR INTERIOR CEDAR

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$168.54	$161.29	$141.51	($27.03)
GRADE RECOVERY VALUE	371.50	371.50	378.00	6.50
PRODUCT DISTRIBUTION VALUE	371.50	387.00	396.00	24.50
INCREMENTAL IMPROVEMENT		$22.75	$28.78	$51.53

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 225.5

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	38,006	36,371	31,910	(6,095)
GRADE RECOVERY VALUE	83,773	83,773	85,239	1,466
PRODUCT DISTRIBUTION VALUE	83,773	87,269	89,298	5,525
INCREMENTAL IMPROVEMENT		$5,130	$6,490	$11,620

PROPOSED IMPROVEMENTS FOR INTERIOR CEDAR

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	42%	44%	50%	
RECOVERY (fbm/M3 NOMINAL)	200.00	209.00	238.00	
RECOVERY (fbm/M3 NET)	178.00	186.00	212.00	
LOG COSTS ($/M3)	$30.00	$30.00	$30.00	
NET LOG COSTS ($/MFBM)	$168.54	$161.29	$141.51	
INCREMENTAL IMPROVEMENT		($7.25)	($19.78)	($27.03)

2) GRADE RECOVERY

	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	10	10	10	$40
UTILITY	10	10	10	$120
CONSTRUCTION	65	65	60	$420
SHOP/CLEAR	15	15	20	$550
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$371.50	$371.50	$378.00	
INCREMENTAL IMPROVEMENT			$6.50	$6.50

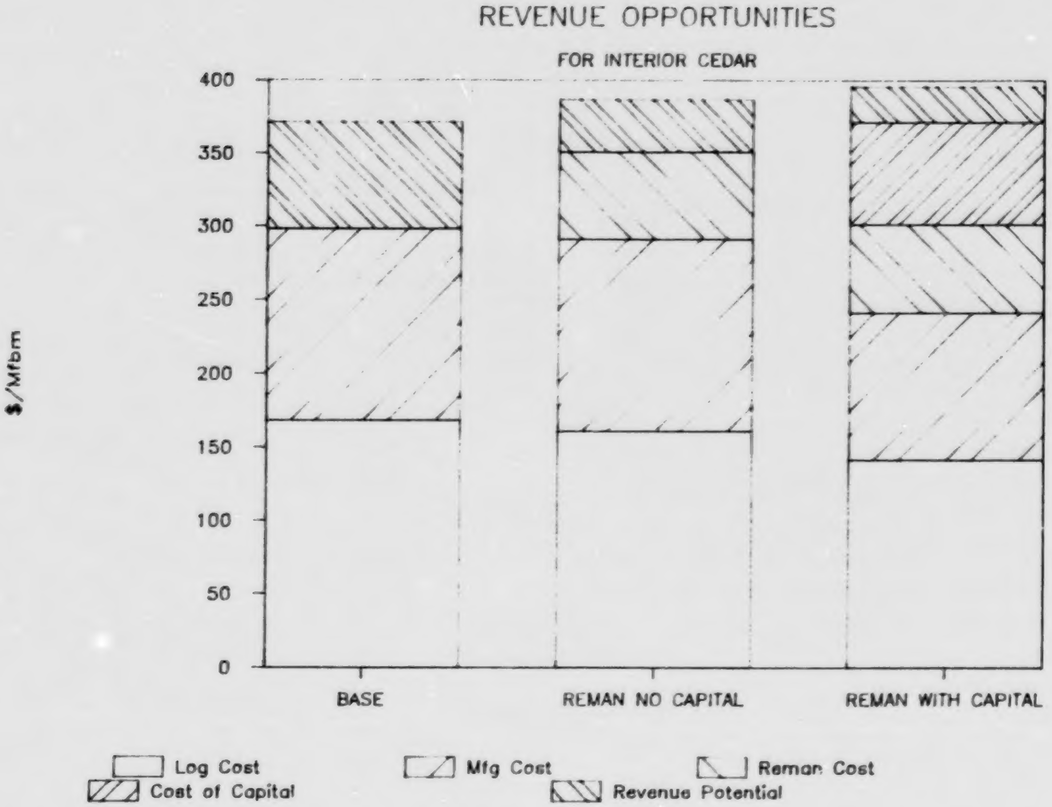
3) PRODUCT DISTRIBUTION

	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
LOW GRADE FENCING POSTS:				
ECONOMY	10	10	10	40
UTILITY	10	10	10	120
DECORATIVE:				
TK PANELLING/				420
BEAMS/STRINGERS/EXPOSED POSTS	65	65	60	420
JOINERY (Appearance):				
SHOP/CLEAR	15			550
CLEAR		4	4	800
PANEL/SASH/COMPONENTS		11	16	600
OTHER PRODUCTS:				
FINGER JOINT (From economy)				
FINGER JOINT (From utility)				
PRESSURE TREATED				
LAMINATED STOCK				
MSR				
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$371.50	$387.00	$396.00	
INCREMENTAL IMPROVEMENT		$15.50	$9.00	$24.50
GROSS IMPROVEMENT (of 1 & 3)				$51.53

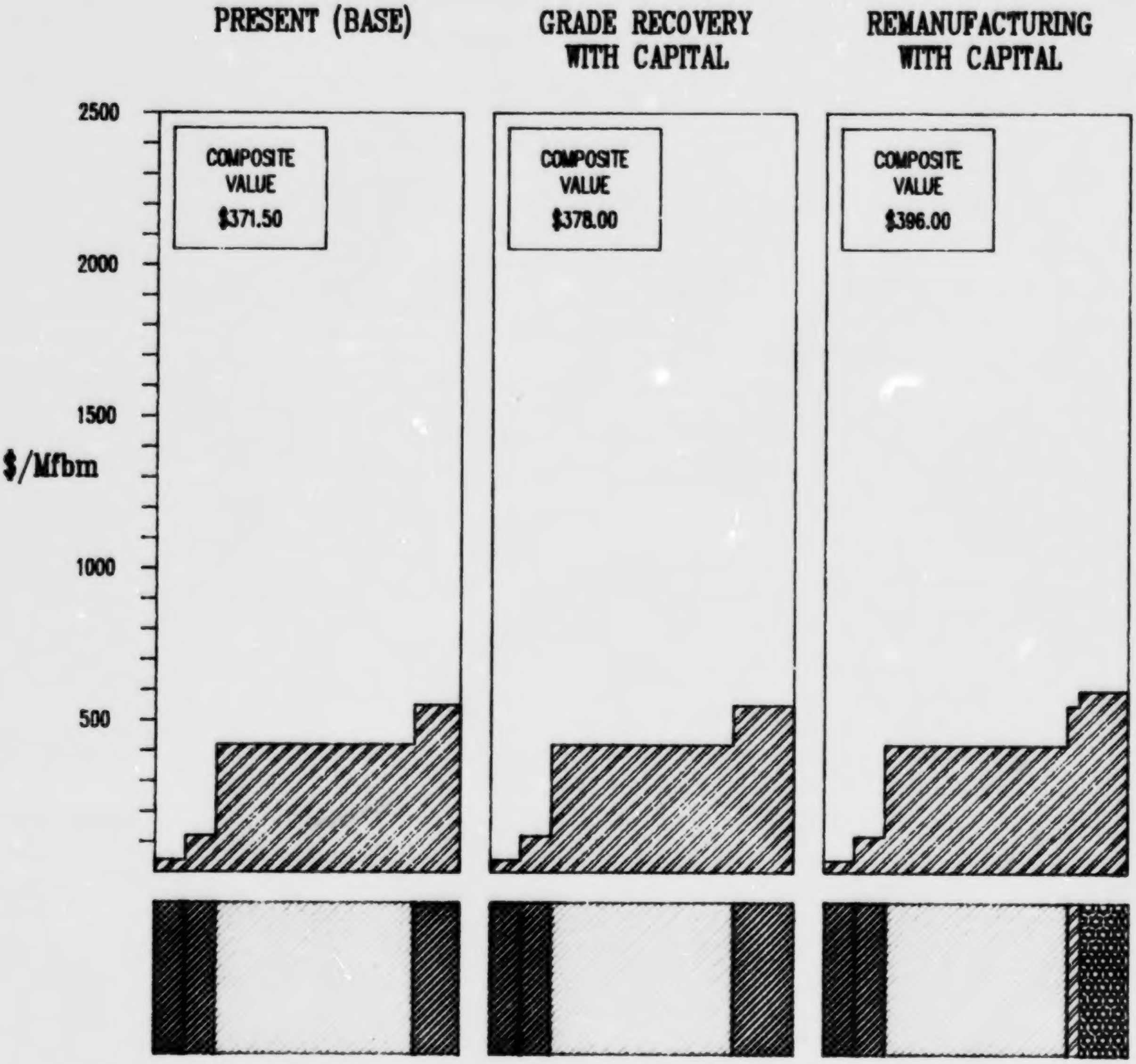
PROVINCIAL PRODUCT DISTRIBUTION FOR INTERIOR CEDAR

PRODUCT DISTRIBUTION

PRODUCT	MMfbm / year PRESENT (BASE)	- REMANUFACTURING - NO CAPITAL	 WITH CAPITAL
EXPENDABLE:			
ECONOMY	22.6	22.6	22.6
UTILITY	22.6	22.6	22.6
CONSTRUCTION:			
TK PANELLING/ BEAMS/STRINGERS/EXPOSED POSTS	146.6	146.6	135.3
JOINERY (Appearance):			
SHOP/CLEAR	33.8		
CLEAR		9.0	9.0
PANEL/SASH/FURNITURE/COMPONENTS		24.8	36.1
OTHER PRODUCTS:			
FINGER JOINT (From economy)			
FINGER JOINT (From utility)			
PRESSURE TREATED			
LAMINATED STOCK			
MSR			
	225.5	225.5	225.5


REVENUE OPPORTUNITIES
FOR INTERIOR CEDAR
$/Mfbm
400
350
300
250
200
150
100
50
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential

PROPOSED IMPROVEMENTS FOR INTERIOR CEDAR



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	40.00	10	10	10	▨ FINGER JOINT ▤		
▨ UTILITY GRADE	120.00	10	10	10	▨ FINGER JOINT ▤		
					MSR ░		
░ CONSTRUCTION GRADE	420.00	65	60	60	░ PRESSURE TREATED ░		
▨					▨ LAMINATED STOCK ☐		
					COMPONENTS ▦	16	600.00
▨ SHOP/CLEAR GRADE	550.00	15	20	4	▨		

Table 37

Tables of Cost and Revenue Improvements For Interior Hemlock

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR INTERIOR HEMLOCK

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$168.54	$161.29	$141.51	($27.03)
GRADE RECOVERY VALUE	242.40	253.00	253.00	10.60
PRODUCT DISTRIBUTION VALUE	242.40	254.65	267.50	25.10
INCREMENTAL IMPROVEMENT		$19.50	$32.63	$52.13

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 386.1

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	65,073	62,274	54,637	(10,436)
GRADE RECOVERY VALUE	93,591	97,683	97,683	4,093
PRODUCT DISTRIBUTION VALUE	93,591	98,320	103,282	9,691
INCREMENTAL IMPROVEMENT		$7,529	$12,599	$20,127

PROPOSED IMPROVEMENTS FOR INTERIOR HEMLOCK

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	42%	44%	50%	
RECOVERY (fbm/M3 NOMINAL)	200.00	209.00	238.00	
RECOVERY (fbm/M3 NET)	178.00	186.00	212.00	
LOG COSTS ($/M3)	$30.00	$30.00	$30.00	
NET LOG COSTS ($/MFBM)	$168.54	$161.29	$141.51	
INCREMENTAL IMPROVEMENT		($7.25)	($19.78)	($27.03)

2) GRADE RECOVERY

	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	5	5	5	$40
UTILITY	15	10	10	$160
CONSTRUCTION	74	75	75	$260
SHOP/CLEAR PULL OUTS	6	10	10	$400
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$242.40	$253.00	$253.00	
INCREMENTAL IMPROVEMENT		$10.60		$10.60

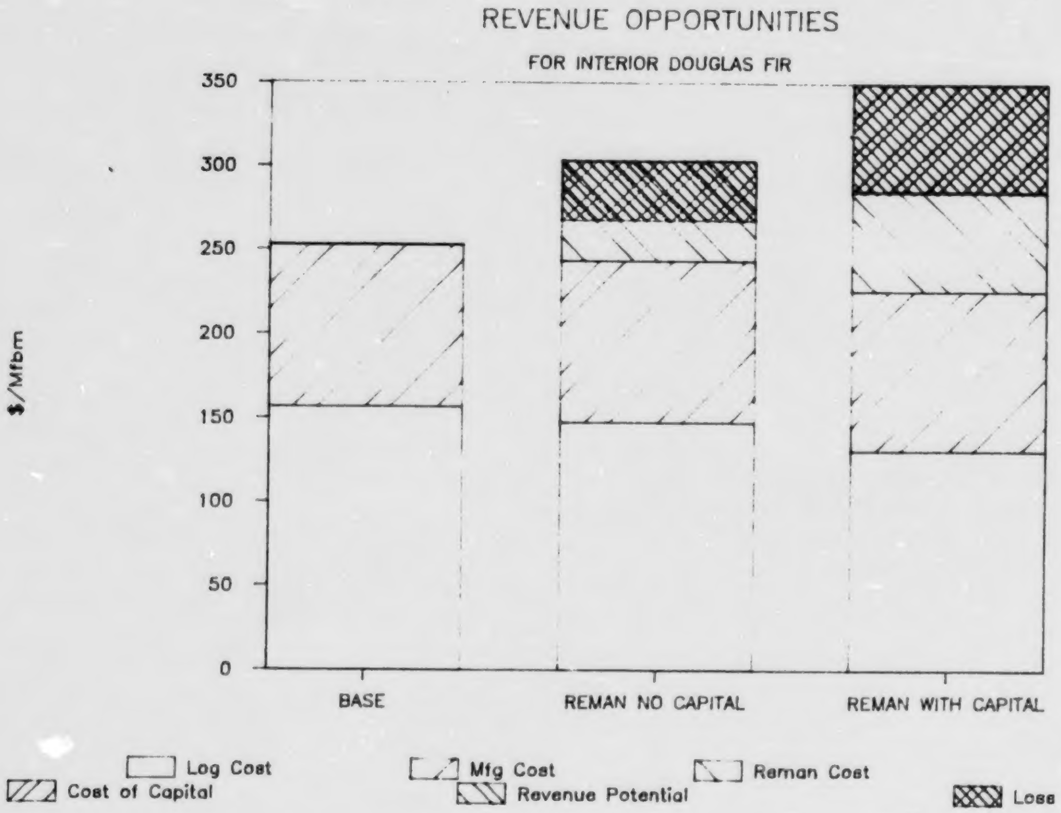
3) PRODUCT DISTRIBUTION

	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY	5	5	5	40
UTILITY	15	10	10	160
CONSTRUCTION:				
POSTS/BEAMS/FRAMING LUMBER	74	69	55	260
JOINERY:				
SHOP				
SHOP/CLEAR PULL OUTS	6	6	10	400
COMPONENTS				
OTHER PRODUCTS:				
FINGER JOINT (From economy)				
FINGER JOINT (From utility)				
PRESSURE TREATED		2.5	5	340
LAMINATED STOCK		2.5	5	350
MSR		5	10	320
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$242.40	$254.65	$267.50	
INCREMENTAL IMPROVEMENT		$12.25	$12.85	$25.10

GROSS IMPROVEMENT (of 1 & 3) $52.13

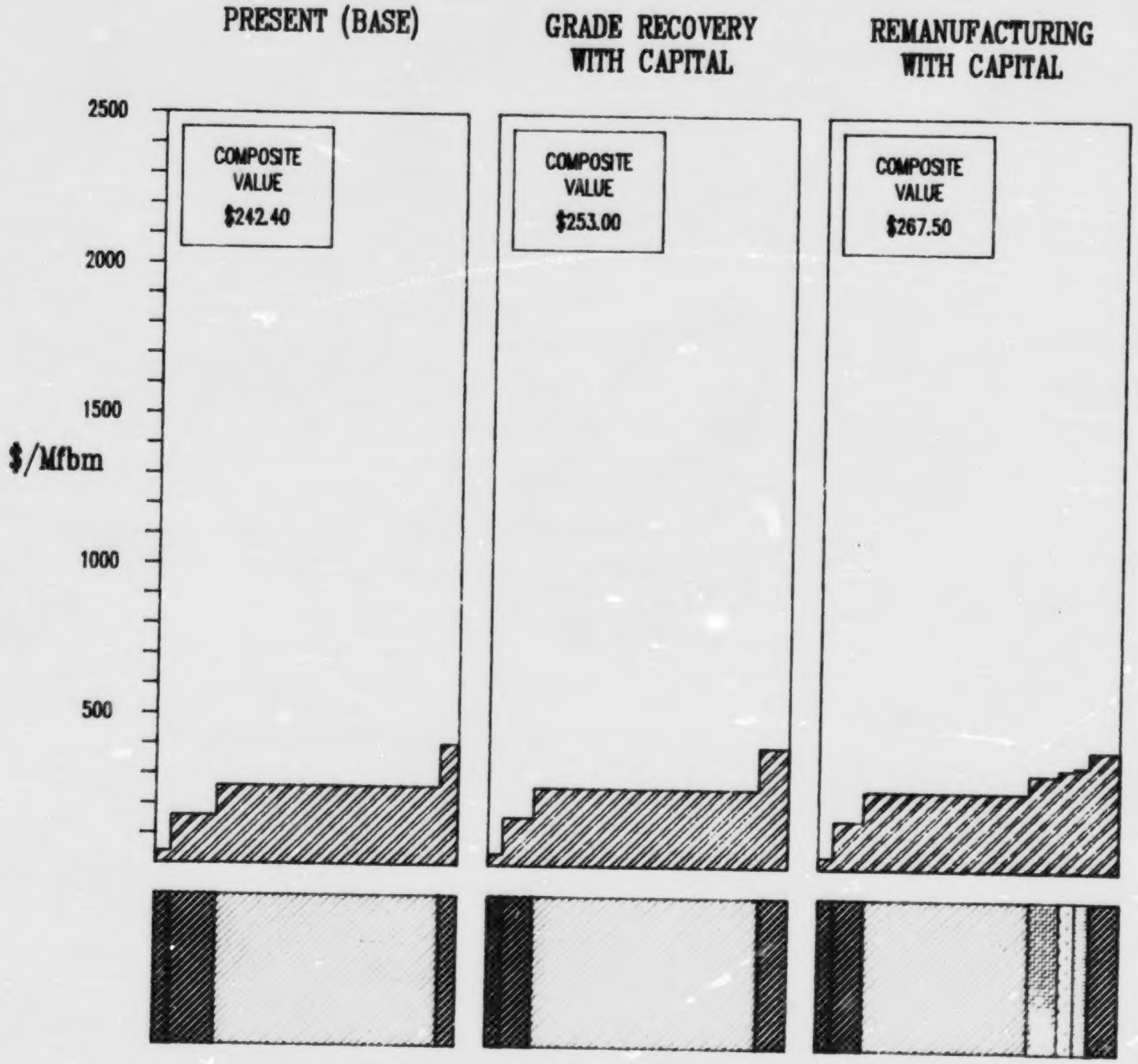
PROVINCIAL PRODUCT DISTRIBUTION FOR INTERIOR HEMLOCK

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	19.3	19.3	19.3
UTILITY	57.9	38.6	38.6
CONSTRUCTION:			
BEAMS/STRINGERS/POSTS/	285.7	266.4	212.4
JOINERY:			
SHOP			
SHOP/CLEAR PULL OUTS	23.2	23.2	38.6
COMPONENTS			
OTHER PRODUCTS:			
FINGER JOINT (From economy)			
FINGER JOINT (From utility)			
PRESSURE TREATED		9.7	19.3
LAMINATED STOCK		9.7	19.3
MSR		19.3	38.6
	386.1	386.1	386.1


REVENUE OPPORTUNITIES

FOR INTERIOR DOUGLAS FIR

PROPOSED IMPROVEMENTS FOR INTERIOR HEMLOCK



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	40.00	5	5	5	▨ — FINGER JOINT ▤		
▨ UTILITY GRADE	160.00	15	10	10	▨ — FINGER JOINT ▤		
					MSR ▨	10	320.00
▨ CONSTRUCTION GRADE	260.00	74	75	55	▨ — PRESSURE TREATED ▨	5	340.00
▨					▨ — LAMINATED STOCK ☐	5	350.00
					COMPONENTS ▩		
▨ SHOP/CLEAR GRADE	400.00	6	10	10	▨		

Table 38

Tables of Cost and Revenue Improvements For Interior Douglas Fir

SUMMARY OF COST AND REVENUE IMPROVEMENTS FOR INTERIOR DOUGLAS FIR

	$/Mfbm			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	$157.07	$147.78	$131.00	($26.06)
GRADE RECOVERY VALUE	253.50	264.50	264.50	11.00
PRODUCT DISTRIBUTION VALUE	253.50	268.00	285.75	32.25
INCREMENTAL IMPROVEMENT		$23.78	$34.53	$58.31

SUMMARY OF PROVINCIAL EFFECT

PROVINCIAL VOLUME (MMfbm/year) : 658.4

	$ (Thousands)			
IMPROVEMENT AREA	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT
NET LOG COSTS	103,414	97,300	86,253	(17,160)
GRADE RECOVERY VALUE	166,904	174,147	174,147	7,242
PRODUCT DISTRIBUTION VALUE	166,904	176,451	188,138	21,233
INCREMENTAL IMPROVEMENT		$15,660	$22,734	$38,394

PROPOSED IMPROVEMENTS FOR INTERIOR DOUGLAS FIR

1) LOG RECOVERY

	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	
% OF LOG VOLUME	45%	48%	54%	
RECOVERY (fbm/M3 NOMINAL)	213.00	226.00	255.00	
RECOVERY (fbm/M3 NET)	191.00	203.00	229.00	
LOG COSTS ($/M3)	$30.00	$30.00	$30.00	
NET LOG COSTS ($/MFBM)	$157.07	$147.78	$131.00	
INCREMENTAL IMPROVEMENT		($9.28)	($16.78)	($26.06)

2) GRADE RECOVERY

	-- % GRADE DISTRIBUTION --			
GRADES	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
ECONOMY	5	5	5	$60
UTILITY	15	10	10	$170
CONSTRUCTION	74	75	75	$270
SHOP/CLEAR PULL OUTS	6	10	10	$420
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$253.50	$264.50	$264.50	
INCREMENTAL IMPROVEMENT		$11.00		$11.00

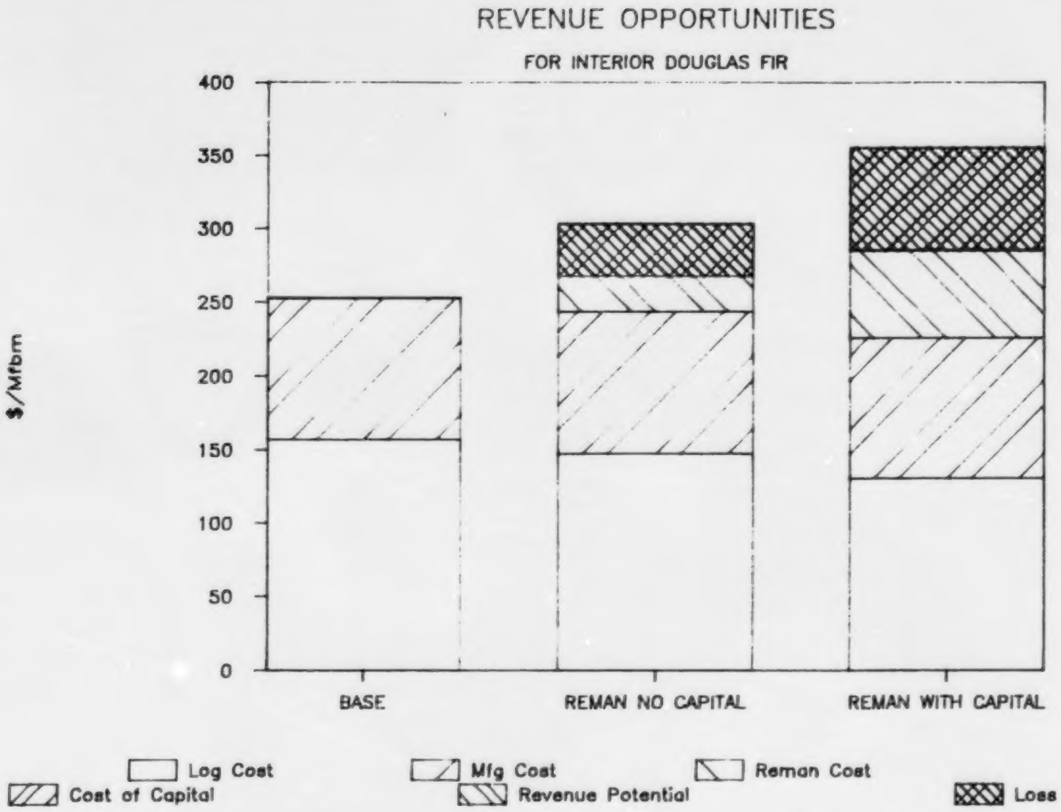
3) PRODUCT DISTRIBUTION

	- % PRODUCT DISTRIBUTION -			
		- REMANUFACTURING -		
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	REVENUE ($/Mfbm)
EXPENDABLE:				
ECONOMY	5	2.5	2.5	60
UTILITY	15	12.5	7.5	170
CONSTRUCTION:				
TIES/TIMBERS/FORMWORKS	10	7.5	5	270
FRAMING	54	49	40	270
BEAMS/STRINGERS/EXPOSED POSTS	10	7.5	5	270
JOINERY:				
SHOP				
SHOP/CLEAR PULL OUTS	6	6	10	420
COMPONENTS				
OTHER PRODUCTS:				
FINGER JOINT (From economy)		2.5	5	260
FINGER JOINT (From utility)		2.5	5	260
PRESSURE TREATED		2.5	5	350
LAMINATED STOCK		2.5	5	360
MSR		5	10	330
	100%	100%	100%	
COMPOSITE VALUE ($/MFBM)	$253.50	$268.00	$285.75	
INCREMENTAL IMPROVEMENT		$14.50	$17.75	$32.25

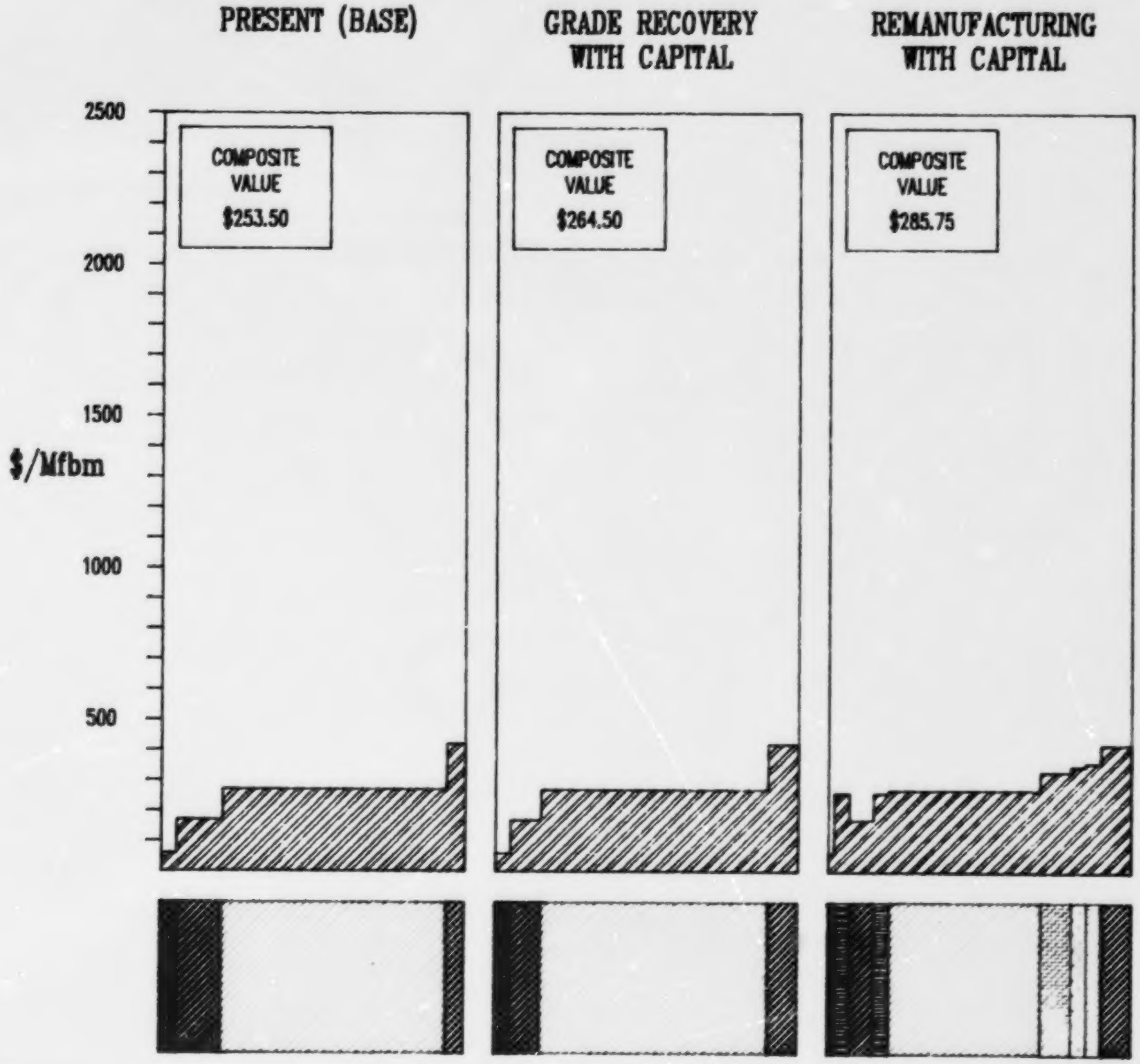
GROSS IMPROVEMENT (of 1 & 3) $58.31

PROVINCIAL PRODUCT DISTRIBUTION FOR INTERIOR DOUGLAS FIR

PRODUCT	PRESENT (BASE)	- REMANUFACTURING - NO CAPITAL	WITH CAPITAL
	MMfbm / year		
EXPENDABLE:			
ECONOMY	32.9	16.5	16.5
UTILITY	98.8	82.3	49.4
CONSTRUCTION:			
TIES/TIMBERS/FORMWORKS	65.8	49.4	32.9
FRAMING	355.5	322.6	263.4
BEAMS/STRINGERS/EXPOSED POSTS	65.8	49.4	32.9
JOINERY:			
SHOP			
SHOP/CLEAR PULL OUTS	39.5	39.5	65.8
COMPONENTS			
OTHER PRODUCTS:			
FINGER JOINT (From economy)		16.5	32.9
FINGER JOINT (From utility)		16.5	32.9
PRESSURE TREATED		16.5	32.9
LAMINATED STOCK		16.5	32.9
MSR		32.9	65.8
	658.4	658.4	658.4


REVENUE OPPORTUNITIES
FOR INTERIOR DOUGLAS FIR
$/Mfbm
400
350
300
250
200
150
100
50
0
BASE
REMAN NO CAPITAL
REMAN WITH CAPITAL
Log Cost
Mfg Cost
Reman Cost
Cost of Capital
Revenue Potential
Loss

PROPOSED IMPROVEMENTS FOR INTERIOR DOUGLAS FIR



	BASE REVENUE ($/Mfbm)	PRSNT DIST. (%)	FUTR. DIST. (%)	(%)	REMANUFACTURING PROCESS AND RESULTING FUTURE DIST.	(%)	REMAN REVENUE ($/Mfbm)
▨ ECONOMY GRADE	60.00	5	5	2.5	▨ FINGER JOINT ▤	5	260.00
▨ UTILITY GRADE	170.00	15	10	7.5	▨ FINGER JOINT ▤	5	260.00
▨ CONSTRUCTION GRADE	270.00	74	75	50	▨ MSR ☐	10	330.00
					PRESSURE TREATED ☐	5	350.00
▨					▨ LAMINATED STOCK ☐	5	360.00
					COMPONENTS ▨		
▨ SHOP/CLEAR GRADE	420.00	6	10	10	▨		

TABLE OF PROVINCIAL PRODUCT DISTRIBUTION FOR ALL SPECIES

This spreadsheet is a summary of all B.C. species by product distribution. The base case used in this model does not recognize the 2,200 mmfbm currently remanufactured in the province.

The third column illustrates the effect of capital expenditure in the primary sector, which will direct more wood into higher priced products and further expand the opportunity for additional growth in the remanufacturing sector.

Table 39

TABLE OF PROVINCIAL PRODUCT DISTRIBUTION FOR ALL SPECIES

	MMfbm / year		
		- REMANUFACTURING -	
PRODUCT	PRESENT (BASE)	NO CAPITAL	WITH CAPITAL
EXPENDABLE:			
ECONOMY	757.1	215.1	201.1
UTILITY	1,379.5	306.5	259.6
CONSTRUCTION:			
TIES/TIMBERS/FORMWORKS	633.4	554.0	860.1
FRAMING	8,544.6	6,628.1	4,821.9
BEAMS/STRINGERS/EXPOSED POSTS	698.4	599.6	426.9
TK PANELLING	231.5	231.5	231.5
JOINERY			
SHOP	127.0	66.1	79.3
SHOP/CLEAR PULL OUTS	228.1	228.1	435.3
SHOP/CLEAR	33.8		
SHOP/4 CLEAR	518.4		
CLEAR	400.4	409.4	433.8
COMPONENTS/TK		174.8	216.1
DOOR & WINDOW COMPONENTS		742.4	833.4
OTHER PRODUCTS			
FINGER JOINTED ECONOMY		493.1	583.7
FINGER JOINTED UTILITY		955.7	1,100.9
PRESSURE TREATED		502.7	1,005.4
LAMINATED STOCK		502.7	1,005.4
MSR		942.4	1,057.7
	13,552	13,552	13,552

SUMMARY OF LOG RECOVERY, GRADE DISTRIBUTION AND PRODUCT DISTRIBUTION

This summary is derived from the detailed spreadsheets for each species. It is presented to emphasize the significance of the three factors which have the most substantial effects on the total Provincial revenue from the lumber industry and on the opportunity to improve margins achieved.

Net log costs - Improvements in log recoveries achieved by the use of more sophisticated equipment will reduce the unit log cost for the primary producer.

Grade Recovery Value - This will improve the sales revenues, largely through additional training of operators and refinement of management technique. Further improvements in grade recovery will result from modified cutting programs which will permit the reman industry to improve the recovery beyond the capabilities of the primary producers.

Production Distribution Value - In many of the species this opportunity provides the most significant gain in revenue. The impact of the greater market penetration by the entrepreneurial remanufacturer provides the opportunity to achieve improved sales values in small specialized markets.

It should be noted that the base case revenue in both grade recovery and product distribution is the same in each species. When the effect of remanufacturing is combined with the primary sector it is difficult to differentiate the source of improvement. Thus the figure shown for the total improvement in each species assumes that grade improvement in the primary mill is also recognized in the product distribution. The total improvement is the sum of log costs and product distribution.

Table 40

SUMMARY OF LOG RECOVERY, GRADE DISTRIBUTION AND PRODUCT DISTRIBUTION

		$/Mfbm				
SPECIES		PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT IN COSTS & REVENUES	TOTAL IMPROVEMENT
COASTAL HEMLOCK	NET LOG COSTS	$247.00	$226.00	$197.00	(50.00)	
	GRADE RECOVERY VALUE	343.80	364.20	372.60	28.80	
	PRODUCT DISTRIBUTION VALUE	343.80	556.45	562.70	218.90	$268.90
COASTAL DOUGLAS FIR	NET LOG COSTS	$260.00	$237.00	$214.00	(46.00)	
	GRADE RECOVERY VALUE	357.90	375.70	386.70	28.80	
	PRODUCT DISTRIBUTION VALUE	357.90	456.40	563.50	205.60	251.60
SITKA SPRUCE	NET LOG COSTS	$415.00	$376.00	$347.00	(68.00)	
	GRADE RECOVERY VALUE	516.00	542.50	605.50	89.50	
	PRODUCT DISTRIBUTION VALUE					157.50
WESTERN RED CEDAR	NET LOG COSTS	$371.58	$338.48	$313.36	(58.22)	
	GRADE RECOVERY VALUE	560.00	567.60	579.00	19.00	
	PRODUCT DISTRIBUTION VALUE	560.00	700.00	754.00	194.00	252.22
YELLOW CEDAR	NET LOG COSTS	$947.63	$909.96	$811.97	(135.67)	
	GRADE RECOVERY VALUE	2,122.00	2,122.00	2,542.00	420.00	
	PRODUCT DISTRIBUTION VALUE					555.67
SPRUCE/PINE/FIR	NET LOG COSTS	$139.04	$127.45	$110.64	(28.40)	
	GRADE RECOVERY VALUE	213.00	215.60	218.20	5.20	
	PRODUCT DISTRIBUTION VALUE	213.00	248.50	260.00	47.00	75.40
LODGEPOLE PINE	NET LOG COSTS	$142.86	$128.71	$112.55	(30.30)	
	GRADE RECOVERY VALUE	201.00	204.20	207.40	6.40	
	PRODUCT DISTRIBUTION VALUE	201.00	321.00	345.00	144.00	174.30
INTERIOR CEDAR	NET LOG COSTS	$168.54	$161.29	$141.51	(27.03)	
	GRADE RECOVERY VALUE	371.50	371.50	378.00	6.50	
	PRODUCT DISTRIBUTION VALUE	371.50	387.00	396.00	24.50	51.53
INTERIOR HEMLOCK	NET LOG COSTS	$168.54	$161.29	$141.51	(27.03)	
	GRADE RECOVERY VALUE	242.40	253.00	253.00	10.60	
	PRODUCT DISTRIBUTION VALUE	242.40	254.65	267.50	25.10	52.13
INTERIOR DOUGLAS FIR	NET LOG COSTS	$157.07	$147.78	$131.00	(26.06)	
	GRADE RECOVERY VALUE	253.50	264.50	264.50	11.00	
	PRODUCT DISTRIBUTION VALUE	253.50	268.00	285.75	32.25	58.31

SUMMARY OF PROVINCIAL EFFECT

This table is developed from the previous spread sheet and translates the improvements achieved in each species into the overall provincial effect by multiplying the incremental improvements by the provincial cut in each species.

Here again the total improvement in each species is the sum of log cuts and product distribution.

In this example it is assumed that 300 million board feet or less than ten percent of the annual harvest of lodgepole pine is used in special product manufacture.

Table 41

SUMMARY OF PROVINCIAL EFFECT

SPECIES	PROVINCIAL VOLUME (MMfbm)		$ (Thousands)				
			PRESENT (BASE)	NO CAPITAL	WITH CAPITAL	IMPROVEMENT IN COSTS & REVENUES	TOTAL IMPROVEMENT
COASTAL HEMLOCK	1,960.1	NET LOG COSTS	484,145	442,983	386,140	(98,005)	
		GRADE RECOVERY VALUE	673,882	713,868	730,333	56,451	
		PRODUCT DISTRIBUTION VALUE	673,882	1,090,698	1,102,948	429,066	$527,071
COASTAL DOUGLAS FIR	559.4	NET LOG COSTS	145,444	132,578	119,712	(25,732)	
		GRADE RECOVERY VALUE	200,209	210,167	216,320	16,111	
		PRODUCT DISTRIBUTION VALUE	200,209	255,310	315,222	115,013	140,745
SITKA SPRUCE	125.3	NET LOG COSTS	52,000	47,113	43,479	(8,520)	
		GRADE RECOVERY VALUE	64,655	67,975	75,869	11,214	
		PRODUCT DISTRIBUTION VALUE					19,735
WESTERN RED CEDAR	926.0	NET LOG COSTS	344,087	313,430	290,175	(53,912)	
		GRADE RECOVERY VALUE	518,560	525,598	536,154	17,594	
		PRODUCT DISTRIBUTION VALUE	518,560	648,200	698,204	179,644	233,556
YELLOW CEDAR	139.1	NET LOG COSTS	131,815	126,576	112,944	(18,871)	
		GRADE RECOVERY VALUE	295,170	295,170	353,592	58,422	
		PRODUCT DISTRIBUTION VALUE					77,293
SPRUCE/PINE/FIR	8,272.3	NET LOG COSTS	1,150,159	1,054,313	915,233	(234,926)	
		GRADE RECOVERY VALUE	1,762,000	1,783,508	1,805,016	43,016	
		PRODUCT DISTRIBUTION VALUE	1,762,000	2,055,667	2,150,798	388,798	623,724
LODGEPOLE PINE	300.0	NET LOG COSTS	42,857	38,614	33,766	(9,091)	
		GRADE RECOVERY VALUE	60,300	61,260	62,220	1,920	
		PRODUCT DISTRIBUTION VALUE	60,300	96,300	103,500	43,200	52,291
INTERIOR CEDAR	225.5	NET LOG COSTS	38,006	36,371	31,910	(6,095)	
		GRADE RECOVERY VALUE	83,773	83,773	85,239	1,466	
		PRODUCT DISTRIBUTION VALUE	83,773	87,269	89,298	5,525	11,620
INTERIOR HEMLOCK	386.1	NET LOG COSTS	65,073	62,274	54,637	(10,436)	
		GRADE RECOVERY VALUE	93,591	97,683	97,683	4,093	
		PRODUCT DISTRIBUTION VALUE	93,591	98,320	103,282	9,691	20,127
INTERIOR DOUGLAS FIR	658.4	NET LOG COSTS	103,414	97,300	86,253	(17,160)	
		GRADE RECOVERY VALUE	166,904	174,147	174,147	7,242	
		PRODUCT DISTRIBUTION VALUE	166,904	176,451	188,138	21,233	38,394
ALL SPECIES	12,894	NET LOG COSTS	2,557,000	2,351,551	2,074,250	(482,750)	
		GRADE RECOVERY VALUE	3,919,045	4,013,149	4,136,574	217,529	
		PRODUCT DISTRIBUTION VALUE	3,919,045	4,871,360	5,180,851	1,261,806	$1,744,556
		INCREMENTAL IMPROVEMENT		1,157,764	586,792		

Table 42

ESTIMATE OF REQUIRED REMANUFACTURING CAPACITY, CAPITAL COST AND MANNING

Reman Unit	Product	Typical Plant (2 shift operation) Annual Capacity (mmfbm/yr.)	Typical Plant (2 shift operation) Manning (incl. Admin.)	Provincial Volume to be Processed (mmfbm/year)	Number of Units Required	Est. Capital Cost/Plant $Million	Total Manpower Employed	Total Capital Requirements $ Million
Finger Joint or Cut Up	Economy & Utility	14.4	14	1,684	117	3.0	1,638	351
Pressure Treating	Construction Stock	15.0	3	1,005	67	0.75	201	50
Resawing Sorting .. Kiln Drying Dressing & Components	Shop Components	40.0	86	876	22	8.0	1,892	176
Lam. Stock and M.S.R.	Upgrade Structural in Primary Mill	30.0	2	2,063	69	0.5	138	35
Total Provincial Impact							3,869	612

The typical plants selected to prepare this estimate are arbitrary. A detailed analysis may result in larger units being selected to suit markets and geographic locations. These figures are derived to give a rough indication of the impact of remanufacturing.

SUMMARY

From the hypothetical analysis of the suggested potential value to be extracted from the fibre of the forest resource in solid wood products in British Columbia, the following observations are made.

It has been shown that incremental value can be achieved through:

a) better log recovery
b) better grade recovery
c) more specialty products

All of the above can be enhanced by the investment of additional capital.

The potential to increase the revenues generated from the forest fibre through specialty product manufacture is substantial. In the analysis, only a marginal improvement in the volume of specialty products coupled with an improvement in the fibre and grade recovery from the log resulted in substantial additional revenue generation.

This hypothetical example shows that, with just a small improvement in specialty product manufacture, substantially quicker and greater revenues would result than from capital invested in the primary sawmill for fibre and grade recovery.

The numbers in this analysis indicate that consideration be given to the manufacturing or specialty products for a greater return on capital before monies are spent on retooling existing primary sawmills.

It is suggested that site specific analysis be made before capital projects are undertaken in the primary sawmills for the potential of specialty product manufacture.

In the analysis to improve product manufacture through increased capital expenditure, it was assumed that $600 million would accomplish the indicated objective and, in consequence, employ an additional 4,000 persons.

Recommended Strategy

XI. RECOMMENDED STRATEGY

There is an emerging recognition and consensus that the opportunities for growth in the British Columbia forest industry lie in the manufacture and marketing of more diverse and higher valued products further developed toward end use. For solid wood products, this means an industry commitment to a strategy of redirection from high volume, low cost manufacture of commodity lumber to one embracing an optimal economic balance between volume and value priorities.

There has been substantial commercial development in the specialty products industry, particularly during the past five years. This has been effected by the efforts of a few primary lumber producers (big and small), independent reman entrepreneurs and by joint efforts between the two groups. Our recommendations for the further development of the industry are based upon the following key premises:

- there is adequate wood fibre;
- there are adequate markets for existing products and adequate markets for future manufacturing potential if proper market development is carried out;
- there is a significant profit potential to be realized;
- private enterprise, pursuing profit will provide the driving forces needed for development;
- there is need for major supportive policies and programs by the public sector to stimulate both demand and supply. it is deemed, however, that prescriptive or interventionist actions are not needed.

- The report contends that it is purposeful to divert lumber production to grades suitable for remanufacture, and acknowledges that these must be site-specific examinations.

- Each company has its individual responsibility to decide for themselves the degree to which products for added-value fits their strategy.

  To develop a business case, the following steps are indicated:

  a) obtain an understanding of the concept and the implications of value-added in terms of the business and the organization;

  b) examine present processes, product mix and markets and the raw material base;

  c) determine the basis on how present production can be profitably diverted or changed to value-added manufacture and marketing;

  d) determine the potential for new products and/or new markets including new manufacturing processes;

  e) develop a business feasibility plan for specialty products, and

  f) incorporate the plan into the overall strategies and operational plan of the total business.

- There is a role for both the primary lumber producer and the independent reman entrepreneur and it must be recognized.

- The primary producer will be the determining influence for the growth of the specialty product industry. Without the volume being produced in grade and cross section, suitable for remanufacture, many of the value-added items cannot be produced profitably. This redirection is not a capital intensive undertaking in most operations.

- The reman operator, by virtue of the entrepreneurial character, and type and scale of facility, can complement the primary producer.
- There is an extraordinary lack of clear understanding of both the limits and the scope and nature of the reman industry including its potential opportunity. This is observed in discussion with several companies and, on occasion, within all levels of management and certain agencies influencing the forest industry.

The solid wood products industry has been perceived to be one which reacts to events rather than one which anticipates the need for change. It is broadly believed in some public agencies that the large integrated forest company is disinclined to support the development of a reman industry. However, with few exceptions, companies appear today to be examining how and to what level of participation they should move toward the further extraction of grade, improved yield and specialty manufacture. Some companies are quite far along this path, while others are tentatively implementing and exploring initiatives. Today, it can be demonstrated that there is sufficient incremental value available through further processing, to provide the incentive for industry re-direction to occur. Contrary to popular opinion, the primary sawmill process and the reman operation are NOT mutually exclusive in all companies. Some sawmill configurations with reasonable or little additional capital expenditure can accommodate a modified cutting program to yield significantly greater value. Expanded sorting facilities in the manufacturing plant (to say nothing of the log sort), can accomplish much. The supplemental facilities are perceived to be cost effective and the body of the report, under the heading "Business Case" sets forth potential profitability.

The reman industry will grow, regardless of any Government stimuli. The pace at which it will grow is the most important consideration in charting the future of the solid wood products industry. There is not yet enough force in the awareness of opportunity to redirect the industry to its logical potential.

The inertia in some management groups which has characterized a part of the industry heretofore can, if allowed, forestall this evolution.

Not all of the lumber companies can change or diversify their process for good and sufficient reasons but the resource is available, the market is adequate, the financial climate is good and the determination must be nourished, to reduce the supply of "Commodity Lumber" and increase the "further manufactured" product side.

It is unrealistic to presume that this can be accomplished by pious declaration or government fiat. It can only be accomplished through the will of private enterprise to assess the options and invest assets as deemed appropriate for the particular business.

We should state that the primary sawmill, is today, and historically has been, the keystone of the British Columbia Forest Industry: -- indeed, of the economy of the whole province. The industry is efficient, adequately capitalized, and positioned to perform in a world market.

Nothing in this proposed strategy is intended to destroy or diminish this major economic force.

However, factual data have been combined with the best knowledge of experts to clearly demonstrate that the forest resource can yield a significantly greater revenue if changes in the primary process are made with a view to cutting and/or sorting, and/or further manufacturing stock for production of specialty products.

This incremental revenue is of a magnitude that it should encourage all primary producers to examine the site specific circumstances relating to each operation and to examine the merits of specialty products, either as a supplier or a manufacturer. Some sawmill configurations, with reasonable or little additional capital expenditure, can accommodate a modified cutting program to yield this greater value.

Change has been effected in many industries by the invention of "new" machines or processes. For example the invention of new glues and the hot press changed the plywood industry dramatically. No new machine has come on stream in the past few decades to dramatically change lumber cutting. Refinements, particularly in process control and materials handling, have made improvements. But it is important to understand, that to bring this industry to an increase of reman products, great capital expenditures are not required. It is a problem of education, with the concomitant dedication to market exploitation.

The desired future of the solid wood industry is perceived to be one of optimum economic balance through integration of manufacture of both commodity lumber and special products.

An important consequence of diverting lumber production to specialty products will be to decrease the North American supply of commodity products. Less volume of dimension lumber available for the U.S. market could create a supply balance during "down" market cycles that would go a long way to stabilize what could otherwise be an over-supplied condition with the resultant price de-escalation.

THE BASIC STRATEGY

To repeat earlier statements, and in light of the foregoing discussion, the rate of expansion of the reman industry is perceived to be the most critical factor to be considered by all parties involved in the industry development effort.

The rate of expansion of product supply must not exceed the rate of expansion of market development for those products or the purpose of the diversion will be frustrated and the consequential financial damage could be irreparable.

The following fundamental strategy is indicated:

I. Forthwith, embark upon a market promotion -- exploitation-- development program to create an increasing demand for reman specialty products which exceeds the natural supply growth or capacity level.

II. Allow the reman production to grow with the normal thrust of private enterprise, utilizing existing public sector financial assistance programs coupled with other supportive processes.

As a consequence of market demand stimulation, supply from the primary sawmills will develop on a firm foundation, with stability and profitability.

MARKET RESEARCH, EXPLOITATION, DEVELOPMENT AND PROMOTION

Some manufacturers may choose to do their own market development, and indeed, have already embarked on such programs. There are also government programs created to assist with this process. This report does not discount nor attempt to dissuade such initiatives. However it is deemed to be of the utmost importance that overall market development NOT be left to individual effort but orchestrated by professionals to achieve the maximum benefits possible through applied expertise and disciplined, concentrated thrust.

The proposal submitted by the Council of Forest Industries (C.O.F.I.) to undertake the activity has much merit and no other organization appears with the competance or the "Head Start" as does C.O.F.I. They have representation in key markets and can build upon them, and from them, as needed elsewhere. They have international stature and are perceived to be a responsible arm of the British Columbia forest industries. COFI also has the expert management to conceive, develop and administer a suitable program and the budgetary experience necessary to effect fiscal responsibility.

If C.O.F.I is to administer the market development program it is important that this function be carried out in a manner totally independent from influence by the tenure holding membership of C.O.F.I. and that a formula be devised to accommodate, as participants, any producers of reman products here in British Columbia. This is not intended to exclude other participants such as shippers, regional associations, sales agencies and consultants, etc if desired and if they serve a purpose. The mandate must embrace all species.

Presuming C.O.F.I. to be the market development organization, they should be encouraged to have a greater presence in the North American marketing and industrial centres. In light of the current per capita consumption of wood products in North America, the Canadian and U.S. markets offer the quickest and greatest potential for expansion.

Good intelligence must be developed on the in situ values and qualities of competitive products.

Attention must be also given to the fact that good data does not exist, on an industry basis, of lumber production by grade and species. This lack is a major deficiency and must be corrected. Nor is good data available on lumber end uses. This, too, should be corrected.

It is believed absolutely essential that the funding for the promotional program to be committed, irrevocably for a minimum of 5 years, with 5 year forward budgeting processes, to ensure the market can be built on a solid foundation without danger of premature cancellation or reduction.

'Who is to fund?' and 'how much?' are two basic questions impacting on participation in and management of the overall program. Ideally, we would recommend that the first five years' activities be fully funded by both levels of governments, WITHOUT contribution by the manufacturer. The program should be conceived by experts, administered by experts, and carried out by experts, to the exclusion of influences by proprietory interests which, by virtue of parsimony or inexpert knowledge, would frustrate the total thrust by the actions of a few. It is recognized however, that industry participation may be the most practical approach and therefore necessary. Finding a suitable formula may be difficult. The following observations may assist in finding the right solution.

1. The cost to the independent reman operator should not be a disincentive to membership. During the first few years of the program, a relatively modest fee structure should be adopted.

2. The funding arrangement should be equitable, but it is doubtful that any formula will be perceived by all the stakeholders to be equitable. Notwithstanding, debate on dues formula should not delay the implementation of the program. Indeed, the details may be better resolved after the level of industry participation is better known.

3. It should NOT provide any member with sufficient clout to frustrate the experts charged with performance.

4. There is an urgency that must be accommodated.

It is germane to note here that for many years it has been the expressed desire of governments to stimulate additional production of "value-added" forest products. Progress towards this laudable objective is probable with prompt and direct action and yet delays in getting a satisfactory program under way could prove extremely damaging.

We also recommend that:

1. A **permanent display** and promotion headquarters be set up at the British Columbia Enterprise Centre, equipped with full audio-visual and electronic communications to facilitate the exchange of intelligence through all levels of trade from the end user to the manufacturer and, importantly, from manufacturer to end user.

   The specificity and detail of some of the products to be sold, particularly in light of the fact that some complexities of language may intrude, would indicate a need for reciprocal visits between end users and manufacturer. Proper use of such electronic facilities could obviate some of this expensive travel. More importantly however, it can provide manufacturers in areas outside Vancouver an opportunity to be informed promptly, and vice versa.

2. Embark upon a program that will handle an Annual Wood Fair here in British Columbia to which the world's wood users should be invited for the purposes of market exploitation and development. Set up a permanent secretariat to be seen to exist -- all year round -- outside the administrative offices of C.O.F.I. but working in harmony with them and also the appropriate agencies in both levels of Government.

   As trade or manufacturing centres grow in places other than Vancouver, this trade fair could move, annually, if a purpose were to be served. It could marry with the Department of Tourism for mutual benefit.

3. Develop at the Enterprise Centre a service, to assist in the practical evaluation, development and 'commercialization' of product and business initiative opportunities. This assistance would be provided to potential users, investors and manufacturers, particularly independent smaller entities.

   This office should be capable of directing interested parties, both visiting and provincial, where and to whom they should direct their enquiries for further intelligence on this developing industry. This is perceived to be an important function, to be undertaken by a high profile staff, knowledgeable of and with the confidence of the forest industry. Such a staff could perform a necessary liaison between all interested parties and be effective in circumventing delaying impediments.

4. The provincial government, working with the support of the Federal Department of Industrial Regional Expansion, should set up forthwith, a major symposium to involve all levels of enterprise to enhance the development of the reman industry in the province.

   This symposium should be structured to address existing and potential markets, infrastructure requirements (such as distribution channels, research needs and priorities), product and production economics and the roles of the primary and remanufacturer. This will provide an opportunity for dialogue on manufacturing techniques.

   An interface between the reman operator and the other sectors of the forest industry must take place sooner or later or the confrontational atmosphere that presently exists in some quarters will not dissipate. A strong and complementary relationship must be achieved.

A better understanding on the part of both the primary manufacturer and the reman operator, (even if they be in the same corporation) of the needs and limitations of the other party, can go far in negating some of the misunderstandings observed to exist. This surely is a matter of better communications and the symposium, under proper auspices and organization, can further a better understanding.

5. Regional seminars are recommended to spread awareness of methods of manufacturing lumber alternatives to 'commodity cutting' and to demonstrate the values to be achieved. The content of the seminars should be tailored to the type and extent of the timber resource or species mix within the region, and should recognize site specific factors influencing grade, recovery, product alternatives, costs, etc. The issues should address the essential success factors for value-added manufacture, e.g. quality, etc. Such an initiative should be aggressively sponsored by government, as an extension to regional economic seminars now being conducted by the Ministry of Economic Development and the Ministry of Forest and Lands.

6. Governments must continue efforts to ameliorate the competitive disadvantages of discriminatory tariffs and non tariff barriers in trading regions wherever possible.

SUPPLY AND DISTRIBUTION

Developing the most appropriate channel of supply distribution to effect better linkages between end-user and producer is highly dependent on geographic markets.

Three Basic Geographic Markets Exist for Specialty Products

A. British Columbia and Northwestern U.S.A.

These markets are "Truck Haul" in smaller quantities per order but can consume huge quantities in the production of doors, windows, furniture, industrial purposes and consumer goods.

B. Canadian and U.S. Rail Market

This embraces all of Canada outside Market A. Truck haul is NOT excluded.

C. Waterborn Export

i.e., United Kingdom, Continental Europe, Japan, China, South East Asia, Middle East, etc., etc. and, importantly, the U.S. East Coast.

Each of these markets is sold in a manner unique onto itself with advantages and constraints peculiar to each. There are many avenues of trade for each market (agents, wholesalers, exporters, brass platers, etc.). Time and experience will sort out the best and the survivors.

There is no suggestion herein to intrude into these arrangements except to note that too many sales agencies, unfamiliar with the product, and without responsibility to the manufacturer can prove counter-productive.

It should be noted, however that each link in the chain of communications between end user and manufacturer is another opportunity for confusion and a probable reduction in potential profit.

SUPPLY OF PRODUCT

There is a significant profit to be obtained through processing methods directed to sorting, cutting and remanufacturing operations. The increasing recognition of this potential and awareness of how to achieve profitability will provide the key stimulus to not only support added marketing thrust, but also to invest in supply.

A catalyst is needed to promote change based on awareness and, the public sector can play a supportive role in this respect. The Provincial Government, as custodians of the resource, should ensure that the pertinent facts are before all of the persons in a position to make decisions. This can be only be done by making sure all persons involved in the industry, through all levels of management to the Chairman of the Board, are aware of the need for change and the potential for British Columbia if a satisfactory degree of change comes about. The dissemination of this sort of information is a proper, important, and effective use of Government funds. Comments on the need for a symposium and the conduct of regional seminars have been noted earlier.

THE NEEDS OF THE SMALLER INDEPENDENT REMAN ENTREPRENEUR

Much concern has been expressed for the needs and the future of the smaller entrepreneurs who have played a significant role in developing the specialty wood products industry, and who still have a large stake in product manufacture and marketing. The entrepreneurial nature of the owners, their marketing orientation and the type of facilities employed lend themselves to the flexibility and smaller scale of operations needed for the reman industry. This has been recognized by some primary producers who have embarked on a value strategy and, as a consequence, have formed effective relationships on a custom cutting basis. Combining the primary effectiveness of log processing with the 'attention to detail' of the small reman operation is desirable.

Obtaining sufficient supply of the required grade and species at reasonable price levels has been an expressed concern of some independents.

The fibre exists in ample quantities. Notwithstanding, it is not realistic to presume that a primary manufacturer will sacrifice revenue to subsidize a local reman operator. Similarly, it is NOT logical to presume that the primary producer will unreasonably withold supply from the independent reman operator. Indeed, reman companies have achieved a stable supply of raw material through their expertise in purchasing and negotiation and long range planning. Most importantly, as the market for reman products grows through stimulation, a greater number of primary sawmill operators will modify their cutting procedures to extract the suitable grades from the log for further manufacture in their own operations or have it done on a custom basis. In either event, the desired end result will be achieved.

In the research for this report, it was found that in itself, the Small Business Enterprise Program would not contribute significantly to the availability of raw material needed by the producer of specialty products. In general, the independent remanner has little, if any, interest, per se, in logging or integrating backward in primary processing. There is no basis to support a case that reallocation of timber by itself will be a stimulus to the increased production of added-value. The identification of added-value processing as criteria may focus attention on the higher value use of the resource.

The FINANCIAL AND TECHNICAL PROBLEMS faced by the small company may be a major inhibitant to his growth. It should be noted here that there are many government agencies already set up to advise and assist and there is professional expertise available within the community. The extent to which these are utilized become a matter of individual initiative. In the development of this report, it was observed that there is a remarkable lack of awareness of the assistance currently available from both levels of government, and from professional consultants within the province.

Added emphasis must be given to imparting the nature, extent and applicability of this assistance to the parties involved. This is a further purpose for the regional seminars.

There exists a presumption that the typical reman operator has insufficient identifiable collateral to warrant accommodation in some financial quarters. This may be due to the belief that "tenure" or "Guaranteed Raw Material Supply" are the only suitable assets. Assistance by the governments to correct this impression could be helpful. Generally, the smaller independent tends to be underfinanced and undercapitalized. There is a case to be made for education of the financial industry to improve their understanding of specialty forest products. Also, the independents must 'do a better job' of preparation and presentation of business plans to obtain needed financing.

It is noted that the independent is denied full benefit of technical research and development by virtue of the cost and risk involved in evaluating and 'commercializing' the application of new technology and equipment. The public sector could provide assistance in this area.

SELLING the product may become an expensive exercise, both in selling costs and his inability to obtain the full value of the product due to his own lack of expertise. He may find his best avenue to the market, is to align himself with one of the traditional agencies already active in the respective markets.

It is noted that JOINT VENTURE and VENTURE CAPITAL concepts may facilitate cooperative initiatives between primaries and reman independents and investors. Each has a contribution to make and with such approaches, each would have a stake in cooperative endeavours.

It is a misconception to think that manufacture of specialty products can only be done by an independent small company. Such companies make an important contribution to the total, but future expansion could well be in the form of satellite divisions of primary manufacturers or arm's length corporations acting in concert, or custom services or any of many forms of cooperation. Private endeavor will probably develop these relationships satisfactorably, but the governments should be ready to assist and cooperate in any reasonable way they can.

OTHER COMMENT

There is a perception that the reman industry is labour intensive. This depends upon the type of product and the mill configuration. In general, direct labour is normally about one-third as great a component of cost as is raw material. However the British Columbia manufacturer of reman products must compete with producers of the same product in other countries (in U.S.A., United Kingdom, Germany, Japan, etc.) from our British Columbia species or species from other countries. Lack of flexibility in the application of labour or an intransigent attitude in the labour force can dramatically impede the growth and competitive posture of British Columbia internationally. An intractable attitude on the part of the owner/manager also can be an impediment. It is of vital importance that all parties, labour, management, government agencies et al, be conscious of the change in the marketing procedures of "Reman products" as opposed to "Commodity products." Scheduling of precise quantities of specific components creates an interdependence between manufacturer and end user that cannot accommodate sporadic or interrupted flow. British Columbia must be seen to be committed to the regular and consistant flow of on grade material or the enterprise will fail for lack of credibility and will frustrate the objective of bringing back to British Columbia, the further manufacture of this resource presently being carried out in foreign markets with their own labour.

Further manufacture of lumber into specialty products and the secondary manufacture of end-use products will, of necessity, create a greater problem of waste disposal than exists. Many of these operations are in urban or suburban areas where ecology constraints must be accommodated.

Imagination and innovative planning can assist in circumventing this impediment and all government agencies, Municipal, Provincial and Federal, must be cooperative and supportive, not only in the problems of disposing of this as waste but, with great importance, assisting in converting this waste problem into a commercial product.

Foreign exchange fluctuations have always had a major impact on the viability of the forest industry. A diversion of fibre from commodity manufacture to specialty products will not negate the importance of foreign exchange but British Columbia should have a greater range of foreign countries purchasing the products with a diversity of foreign currencies, some of which may be less adversely effected than others from time to time. In this regard, it is judged to be extremely important that the development of the foreign markets be undertaken forthwith, whilst foreign currencies are to our advantage, so that a solid responsible inter-dependence can be built with the foreign user on which a less volatile future can be achieved. During this advantageous period, if British Columbia can gain the reputation as a responsible source of consistant supply of proper quality specialty products -- and be regarded internationally as committed thereto, the future of the total forest industry is enhanced immeasurably.

Research and Development should be encouraged. The body of the report indicates that advances can be made in:

a) market research;
b) product research;
c) technical research.

There is a need for a supportive research to reach agreement on priorities, funding and methodology for technology transfer particularly as this effects the smaller independent.

Curricula should be encouraged in trade schools to enhance expertise in:

a) supervisory skills;

b) wood manufacturing skills;

c) better grade yields in British Columbia wood;

d) value-added incentives;

e) a change in primary manufacturing which will accommodate judgemental decisions by mill personnel during the process, (as opposed to typical gang saw procedures) implies a need for greater skill. Training facilities could assist in the development of a more productive labour force;

f) freighting (The complexities introduced into the freighting of wood products, with escalating costs and deregulations have made this component of the selling price a potential inhibitant to the broader reaches of market expansion, and greater expertise can assist significantly.)

g) the importance of reliability to the customer of continuity, particularly in consistent and satisfactory quality, regular and on time delivery schedules and after sale product service.

SECONDARY WOOD PRODUCT MANUFACTURING

Time and resources have not permitted an examination of the secondary manufacturing industry in the depth undertaken for the manufacture of specialty products. Neither has a business case been developed for such manufacture as has been done for specialty lumber.

From the investigation conducted, it becomes evident that:

1. the secondary industry can be expanded;
2. the greater the supply of specialty lumber products available from British Columbia resources, the less must be imported from foreign countries;
3. the secondary industry and the specialty lumber manufacturing industry would be mutually supportive for the betterment of the whole economic community of British Columbia.

PRIORITIES

The solid wood industry is going through a period of examinatin to determine the extent to which it should redirect the future towards more value-added products. This can impact on and alter the way people do things from manufacture of the log through to the interaction with the customer who will dictate what is value and what products are to be made. Changes have and are being made and the time is now opportune to accelerate the process of redirection with a priority and integrated industry effort working in supportive concert with government.

In the development of this report, a consensus was reached that:

a) the market exploitation and promotional activities be assigned the most urgent priority;

b) lumber manufacturers must be made aware of the benefits that can be achieved by the redirection of fiber into grades and cross sections suitable for remanufacture into specialty products. The governments can and should disseminate the facts of this report, but it is incumbent on individual company management to judge to what extent these data are applicable to their operations;

Therefore the industry symposium should be held at the earliest reasonable date to give the industry the opportunity to discuss the broad subject of "added-value" production and most importantly, provide the forum for the interface between the primary producer and the reman entrepreneur;

c) plans should be made for the regional seminars to follow up on the general symposium referred to above;

d) plans should be made to set up, without delay, facilities at B.C. Enterprise Centre which can organize the product displays and wood fairs.

e) coincidentally, the Enterprise Centre office should be capable of directing interested parties, both visiting and provincial, where and to whom they should direct their enquiries for further intelligence on this developing industry. This is perceived to be an important function, to be undertaken by a high profile staff, knowledgeable of and with the confidence of the forest industry. Such a staff could perform a necessary liaison between all interested parties and be effective in circumventing delaying impediments.

This liaison office can perform a valuable service in being a focal point for the recognition of the necessary activities to follow the early development of this industry so that appropriate priorities can be established to ensure its successful future.

Conclusion

XII CONCLUSION

The profitability of the forest industry of British Columbia can be enhanced by the redirection of fibre from commodity lumber products to value-added specialty products.

* It is a logical defensive strategy for the forest industry to become less dependent on the North American housing market.

* Diversion of this fibre into "Specialty Products" (Reman Products), can be more than equally profitable.

There is "quality" fibre available from regular timber flow, not presently being extracted at the primary sawmill level (i.e. the initial breakdown of the log).

As the industry becomes aware of the potential profit available from this use of fibre, more production will be diverted.

This further manufacture may take place at the primary sawmill site or at satellite operations or at non-captive independent facilities.

An unorchestrated expansion of this reman industry could overwhelm the known market. Chaos could result. The purpose of the diversion could be frustrated.

The market for remanufactured wood products must be expanded at a faster rate than the growth of supply.

It will take an effective market development program to support the supply growth.

In simplest possible terms, therefore, the strategy must be to:

a) develop a sufficient market and demand for specialty wood products that the manufacture of those products is profitable, and

b) allow that profit potential to be the influence to divert more fibre into specialty products at the primary and the remanufacturing plants.

The community of British Columbia and indeed, the economy of the whole of Canada can be enhanced by the growth of the specialty forest products manufacturing industry.

The federal and provincial governments should encourage and assist in the redirection from commodity lumber manufacture to specialty remanufactured (value-added) products.